# THE IRON TRADE REVIEW

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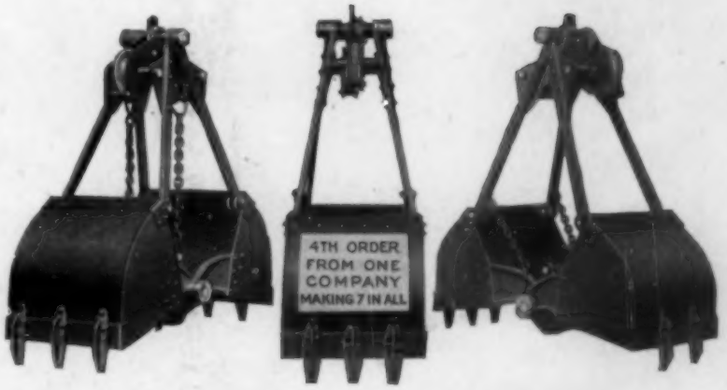


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THE IRON TRADE REVIEW

*Vol. LIX* Cleveland, July 20, 1916 *No. 3*

# Buying of Steel Bars Continues

*Agricultural Implement Manufacturers Place Contracts at 2.35c—Strong Foreign Demand for Pig Iron and Semi-finished Material*

IN THE finished material market, during the past week, interest has centered largely in contracts for steel bars. The announcement last week that contracts had been made with agricultural implement manufacturers for 80,000 tons at 2.35c, Pittsburgh, or $3 per ton less than the price which had been asked by all mills for contracts for the first half of next year, was followed by denials of implement companies that they had closed, and also by denials from representatives of many mills that a price less than 2.50c had been made. Undoubtedly some mills have refused to sell at less than 2.50c, and some implement manufacturers have declined to buy at 2.35c, but at least two additional contracts at 2.35c have been placed this week in the Chicago district, amounting to from 10,000 to 15,000 tons, and heavy tonnages are under negotiation at this time in both the east and the west. Sales to date amount to nearly 100,000 tons.

The announcement of an elaborate new construction plan, calling for the expenditure of about $70,000,000 at the various plants of the Bethlehem Steel Corporation, is regarded as an important expression of confidence in the future of the iron business in this country.

The sale of 50,000 tons of forging billets for delivery in the last quarter of this year and the first quarter of next has been closed in the Chicago district with the Illinois Steel Co. Rail orders taken during the week by the Steel Corporation amounted to 18,000 tons. Rail buying at present is light, but there is a slight revival in car buying. It is reported that the American Ship Building Co. has closed for several additional boats.

**Pig Iron**

Inquiry for pig iron for shipment to foreign countries continues very heavy. It is estimated that in the Philadelphia district two-thirds of the recent business has been for export and it is probable that in other centers the percentage of export business is fully as large. Among the pending inquiries is one for 25,000 tons of low phosphorus pig iron for export during the next six or seven months. The extreme heat is interfering to a marked extent with the operation of furnaces and reduced production for the present month is probable. Some observers believe there will soon be a very active demand for steel-making pig iron for domestic use.

**Foreign Buying**

Foreign buying of steel products still dominates with respect to large tonnage propositions. Orders from Russia for car axles and wheels, noted last week, it is now learned, call for 28,000 steel axles and 56,000 cast iron wheels. This buying will not interfere with the placing of the large Russian car order, which is active. The French government has bought 14,000 tons of rails from the Steel Corporation. The Canadian Pacific has sold the English government 30,000 tons of rails which it has taken from sidings and this road is still trying to buy 30,000 tons on this side. Canadian rail mills, which some months ago sold American roads 35,000 to 40,000 tons of rails, apparently were unable to deliver, as they want to replace this tonnage in the United States. Inquiries are pending for about 18,000 tons of structural material from Canada and buyers there also want large quantities of billets. South Africa is in the market for 12,000 tons of rails. English ship yards want large tonnages of boat material.

**Ferro Alloys**

Many users of ferro-manganese have covered for their requirements for the remainder of this year, but serious doubt has arisen as to whether English makers will be able to deliver on time, and further developments are awaited with interest.

**Sheets**

Increased activity in galvanized products is the most interesting feature of the sheet market. The roofing trade, which under usual conditions is the largest consumer of this product, has not yet come into the market. Prices continue to fluctuate in harmony with the changes in spelter.

# THE OPEN HEARTH

## The Buyer's Dilemma

BUYERS of steel products are standing at the parting of the ways with respect to prices. The opening of the third quarter of the year brings the industry into new high ground as to the figures that underlie contracts which are definitely prescribed for specification within that period. For many companies the crest of the remarkable upward price movement inaugurated one year ago was reached on the business put on their books months back to cover the estimated needs of consumers for the quarter beginning with July. As between the second and the third quarters there is an abrupt upward slant in prices which in plates, shapes and bars range from $10 to $20 a ton on the average of from 1.60c and 2c, Pittsburgh, to 2.50c and higher. With some eastern platemakers, many contracts maturing this quarter show a base of 4c, Pittsburgh.

If buyers could be certain of getting this high-priced material as they ordered it during the next three months, they would be able more definitely to determine whether with safety they could handle it by applying it to the work they then would have upon their books. In that event, the element of risk in taking in high-priced material would be minimized, because it would not be necessary to put this steel in stock. But the present condition of mill deliveries is such that much of the tonnage specified during the current quarter will not be delivered for months hence and a large part of it not until after Jan. 1. The speculative factor for the buyer consequently is greatly increased, for there is little doubt that many consumers entered into the high-level contracts months ago, when the market still was rising, more to protect themselves against possible shortages and to assure themselves of a supply of steel which they might require than to measure their real needs as based upon the actual sales of their own product. If the buyers originally did not enter into these contracts with an eye more upon the rising price line than upon their own assured requirements, it would be a notable exception to the rule in every great upward price movement of the steel industry in recent years.

The present position of the buyers is a difficult one. They are called upon to diagnose probable business conditions months in the future and to specify material at prices far beyond anything ever known in the steel industry, or they will lose their right to the tonnage which the mills have set aside for them. With so much specified tonnage accrued upon their books, the mills are more indifferent whether buyers order in the material due and are inclined to cancel freely wherever the opportunity is offered. For the buyers to specify now means that they are obligating themselves at unheard-of prices on shipments to be made many months hence.

The manner in which specifications are filed by buyers during the next three months will tend to throw considerable light on the true fundamental solidity of the steel market as based on actual requirements in miscellaneous trades and not upon speculation engendered by rapid price advances.

## Now is the Time for Action

SENATOR STONE, of Missouri, a strong administration supporter, is to be congratulated for having called attention to the situation which industries of the United States may face after the European war by reason of proposed foreign trade alliances. He has given warning that this country must be prepared to meet a trade war after hostilities have ended. Senator Lodge, of Massachusetts, also showed that he is alive to the situation and made some interesting observations on the subject.

It remains for the administration to act at once to prevent the United States from being made a dumping ground for foreign goods, and, Senator Stone being in the confidence of the President, it is indicated that the latter desires to forestall the possibility of industries of the United States being discriminated against as the result of European trade alliances, now under discussion, or perfected. It is sincerely hoped that the administration will use the mailed fist and combat any and all attempts by which reprisals will be directed at industries of the United States by foreign countries.

Referring to the intentions of European powers, Senator Lodge said:

That they will try to close the gates of trade and commerce upon us in many directions I regard as highly probable, although the aim and extent of the project must remain at present a matter of speculation. But if we are to meet this situation successfully, we must be prepared economically and industrially, as I believe we should be prepared physically and in arms. The essential thing is to so organize our industries that they will be strong, independent and ready for the conflict when and if it comes. Certainly in order to organize the industries, in order to make them a bulwark and a barricade against the economic struggles we may have to face, the first thing that is necessary is not to cripple, but to encourage them. We must try to put them in a condition so that they can stand behind the people and the government.

But, while Senator Stone has wisely called attention to a condition which the United States may face after the war, it will not avail anything if it is to be ended with a mere investigation, and a half-hearted policy of protection for the industries of this country. Now, when more than 65 per cent of all foreign-made goods

# THE OPEN HEARTH

are entering the ports of the United States free of duty, the administration should provide for ample protective duties, regardless of whether it goes against its political grain or not. The welfare of the country demands it, and that is the only consideration that should be taken into account. It cannot afford to wait for the creation of a tariff commission, desirable as that is, an investigation by it, and uncertain action on the results of its findings by congress. The anti-dumping clause in the omnibus revenue bill may be a help in the way of protecting industries of this country, but it is wholly inadequate,

Unless something is done to afford ample protection to the trade of this country, it will not only find European markets closed to it, but will also be the prey of foreign industries.

A very simple act, authorizing the President to raise tariff rates as necessity may require would temporarily meet the situation.

## The Job's the Test

IT IS genuinely refreshing to see a sane, practical man like Herman Schneider, dean of the college of engineering, University of Cincinnati, tear to pieces the ridiculous theories of some alleged psychologists and others who endeavor to give advice to men of affairs.

Recently some of the gentlemen of finely spun theories have been telling how to select men for jobs by following charts of boy epochs; by examining physical characteristics, such as the shape of the fingers and the head, to discover aptitudes and abilities, and by resorting to various schemes of experimental psychologists, including giving of tests as to memory and other qualifications. Dean Schneider very cleverly shows the folly of adopting such methods and tests and asserts that the only reliable method is the old-fashioned one of the "test on the individual job". In conclusion, the dean points out that the science of applied psychology seems to be at the point where chemistry was when it was alchemy. "Vocational guidance", he says, "should accompany work; it cannot safely precede it for juvenile workers." He believes it should be continuous until the young man or young woman is at least 18 years of age. He believes that mental training and direction by the school should accompany actual work. And the best of it all is that he has shown in Cincinnati and elsewhere that this can be done.

If there are any manufacturers who have been fascinated by the vagaries of theorists as to vocational guidance and selection of men, they will do well to read what Dean Schneider has to say.

## The Most Important Work

AN EMPLOYER of many men in a large city in the central west recently approached a man who had been very successful in getting along with working people, saying, "I want you to tell me where I can hire a man to handle labor problems in my plant."

"You already have that man in your plant," was the prompt response.

The manufacturer looked very much surprised and asked his friend what he meant.

"I mean this," was the reply. "You are sitting at your desk, giving almost your entire time and thought to problems of finance, of selling, and other things, and you are doing mighty little thinking about your employes. If you expect your men to be contented and stay with you and become more skilled, you must get next to them. You must show that you are genuinely interested in their welfare. *You* can do this, but you cannot hire anybody else to do it."

Surely there is food for thought in this little conversation. Probably most employers, if they had heard it, would have said it is absolutely impossible to show the personal interest suggested, because there are so many employes and because large numbers of them do not speak the English language, or are so ignorant that it is out of the question to come closely in contact with them. There is, of course, much truth back of this feeling, and yet we believe that most employers could do much more than they are doing to establish more friendly personal relations with their employes and that the relations of employers and employes will not be greatly improved until this is done.

## The Business Man

*(From an address by David R. Forgan, prominent banker of Chicago, before the Cleveland Chamber of Commerce.)*

I don't know any life better than that of the honorably successful business man. To have endured early hardships with fortitude, to have overcome difficulties by perseverance, to have conducted and developed a large business, useful in itself and giving employment to many; to have achieved position, fortune, independence and influence, to have established a character above reproach, to have accumulated the esteem and confidence and friendship of one's fellows, and to have gained all this of the world without sacrificing the soul to avarice or starving the heart into hardness.

I say that he who has so lived, has nobly lived, and he should find peace and satisfaction when the shadows begin to lengthen and the evening of life draws on.

## Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

*Quotations on leading products July 19, average for June, 1916, average for April, 1916, and average for July, 1915. Prices are those ruling in the largest percentage of sales at the dates named.*

| | Prices July 19, 1916. | Aver. for June, 1916. | Average for Apr., 1916. | Aver. for July, 1915. |
|---|---|---|---|---|
| Bessemer pig iron, Pittsburgh | $21.95 | $21.95 | $21.95 | $14.88 |
| Basic pig iron, Pittsburgh | 18.95 | 18.95 | 19.20 | 13.83 |
| No. 2 Fdy. pig iron, Pittsburgh | 19.45 | 19.45 | 19.45 | 13.60 |
| Northern No. 2 Fdy., Chgo. | 19.00 | 19.00 | 19.00 | 13.00 |
| Lake Superior Charcoal, Chgo. | 19.75 | 19.75 | 19.75 | 15.75 |
| Mall. Bess., Chgo. | 19.50 | 19.50 | 19.50 | 13.00 |
| Southern No. 2, Birmingham | 14.00 | 14.15 | 15.00 | 9.62 |
| Southern Ohio No. 2, Ironton | 18.50 | 18.46 | 18.50 | 12.60 |
| Basic, eastern Pa. | 19.00 | 19.25 | 20.50 | 13.75 |
| No. 2X Virginia furnace | 18.50 | 18.00 | 18.50 | 12.50 |
| No. 2X foundry, Philadelphia | 20.00 | 20.00 | 20.75 | 14.50 |
| Ferro mang., Balti., (1917) | 175.00 | 175.00 | 175.00 | 103.00 |
| Bessemer billets, Pbgh. | 42.00 | 41.20 | 45.00 | 21.40 |
| Bess. sheet bars, Pbgh. | 42.00 | 41.20 | 45.00 | 21.70 |
| Op.-h'th sh. bars, Pbgh. | 44.00 | 41.20 | 45.00 | 22.00 |
| Open-hearth billets, Pbgh. | 44.00 | 41.20 | 45.00 | 21.50 |
| Steel bars, Chgo. | 3.10 | 2.69 | 2.64 | 1.46 |
| Steel bars, Pittsburgh, contr. | 2.50 | 2.50 | 2.50 | 1.26 |
| Iron bars, Philadelphia | 2.559 | 2.559 | 2.559 | 1.25 |
| Iron bars, Cleveland, local del'y. | 2.40 | 2.40 | 2.40 | 1.20 |
| Iron bars, Chgo. mill | $2.35 | $2.35 | $2.35 | $1.20 |
| Beams, Chgo. | 3.10 | 2.69 | 2.64 | 1.46 |
| Beams, Pittsburgh, contr. | 2.50 | 2.50 | 2.50 | 1.26 |
| Beams, Philadelphia | 2.659 | 2.659 | 2.659 | 1.35 |
| Tank plates, Pbgh., contract | 2.90 | 2.75 | 2.67 | 1.22 |
| Tank plates, Chicago | 3.50 | 3.09 | 2.94 | 1.39 |
| Tank plates, Philadelphia | 3.909 | 3.909 | 3.909 | 1.35 |
| Sheets, blk., No. 28, Pbgh. | 2.95 | 2.92 | 2.91 | 1.77 |
| Sheets, blue an., No. 10, Pbgh. | 3.00 | 3.10 | 3.00 | 1.35 |
| Sheets, gal., No. 28, Pbgh. | 4.25 | 4.79 | 4.89 | 4.55 |
| Wire nails, Pittsburgh | 2.50 | 2.50 | 2.40 | 1.59 |
| Connellsville fur. coke, contr. | 2.40 | 2.63 | 2.98 | 1.75 |
| Connellsville fdy. coke, contr. | 3.15 | 3.50 | 3.50 | 2.25 |
| Heavy melting steel, Pbgh. | 16.50 | 16.25 | 18.12 | 13.38 |
| Heavy melting steel, east'n Pa. | 15.25 | 15.75 | 17.75 | 12.00 |
| Heavy melting steel, Chgo. | 14.25 | 15.35 | 16.75 | 10.15 |
| No. 1 wrought eastern Pa. | 19.75 | 20.75 | 23.00 | 13.50 |
| No. 1 wrought, Chgo. | 15.50 | 15.35 | 16.80 | 8.90 |
| Rerolling rails, Chgo. | 16.00 | 16.25 | 17.90 | 10.10 |
| Car wheels, Chgo. | 12.50 | 12.50 | 14.00 | 10.30 |

(For Additional Prices See Page 148)

# Foreign Buying Still Very Active

### *In Philadelphia District, Two Thirds of Pig Iron Business is for Export —Domestic Market Extremely Dull Throughout the Country*

New York, July 18.—New sales of pig iron for export delivery do not appear to have been quite so large the past week, but considerable tonnage was taken and the inquiry remains brisk. An important new negotiation which has been opened by exporters in this city calls for 25,000 tons of low phosphorus iron for shipment over the next six and seven months and delivery is specified at either French, English or Mediterranean ports. From the circumstances, it is believed there are good chances for the business being closed. Difficulty may be had in getting the desired tonnage of this grade, as the furnaces are sold up far ahead. A New York engineering firm asks 2,000 tons of bessemer for Italy. Another inquiry calls for 1,000 to 2,000 tons of special bessemer for Genoa and still another for 3,000 tons of special bessemer. There is some foundry inquiry, including one lot of 500 tons. New sales not previously noted total probably 15,000 tons, almost entirely bessemer. One round lot of bessemer was closed by a Pennsylvania maker and another sale was 3,000 tons of bessemer. Canada took 1,500 tons of low phosphorus. Bessemer for export is quoted from $23.14 to $23.64, New York, or $21 to $21.50, valley basis. Some of the recent iron sold, however, has been coming west of the valleys. There seems to be a little more leeway in freights. From northern parts to Italy the regular lines are asking $33 a ton and this has been paid in some cases, but lower also has been done. From New Orleans to Italy, $28 is being quoted. The domestic market is dull and practically featureless. From 5,000 to 10,000 tons of iron are expected to be required for segments for the new Sixtieth street tunnel here now being awarded. There is a local inquiry for 1,500 tons still open. Low price reports are coming out here and there, one to the effect of a $19.85 price for No. 2X in New England which is attributed to resale offerings from central Pennsylvania.

#### Domestic Market at a Standstill

Pittsburgh, July 18. — England, France and Italy are active buyers of bessemer pig iron in the Greater Pittsburgh district. For several weeks brokers have been scouring the central west for all available tonnages of this grade. It is difficult to tell exactly how much tonnage has been purchased recently, but it is conservatively estimated that sales since June 30 involve fully 20,000 tons. One interest is understood to have sold 10,000 tons of bessemer iron for export, but details of this transaction are lacking. Foreigners are paying $21 and $21.50, valley, for standard bessemer iron.

From a purely domestic standpoint, the pig iron market is almost at a standstill. While the melt of iron has not been decreasing, no new buying of importance has been noted for several weeks. Dealers express the hope that all grades will reflect strength before autumn and it is predicted by some that an actual shortage of iron may exist 60 or 90 days hence. Prices, firmly maintained, are unchanged in position.

#### Foreign Demand Arouses Interest

Philadelphia, July 17.—A fair survey of the relative importance and activity of new pig iron trading in this district shows two-thirds of export tonnage to one-third of domestic. More weight constantly is being attached to the continuing demand from foreign buyers. A larger number of makers have become interested in this traffic with fair success and the production of iron in eastern and central Pennsylvania districts primarily for export is growing steadily. In addition to a large Schuylkill valley furnace which is making bessemer for Italy, a Lehigh valley stack is being operated on steelmaking iron

(*For complete prices see page* 148.)

almost entirely for foreign account and a central Pennsylvania maker who has been producing foundry grades is switching to bessemer to fill new sales. Low phosphorus has continued to command liberal foreign sales at $30 to $31, eastern furnace. The week's sales include lots of 2,000 tons and 500 tons respectively to Italy and 1,000 tons additional to Canada. There also has been considerable buying of this grade for this year by domestic consumers in the east. One of the latter closed for 4,000 tons and another for 600 tons. One eastern furnace making low phosphorus is sold up to Jan. 1, and another to Oct. 1. Foreign buyers freely seek 0.04 phosphorus iron. A Philadelphia merchant has inquired for 2,000 tons of foundry and 2,000 tons of steelmaking grades for export. A 2,000-ton lot of standard low phosphorus for Italy, for July-August delivery, is current. There are various other export inquiries.

The domestic market shows a continuance of small sales and a pronounced indifference of buyers. Prices generally are easy, but makers are finding that concessions do not stimulate interest and are more disposed to let the market drift. Eastern Pennsylvania foundry grades offered at very low prices this week were ignored. The nominal spread on No. 2X is $19 to $20, furnace, with few sales at any figure. A Harrisburg buyer wants 500 tons. A Delaware river pipe works bought 500 tons of prompt low silicon at a reported price of $18, delivered. Reports that a small steel works along the Delaware just beginning operations was able to buy 500 tons of early basic under $19, delivered, appear inaccurate. The usual figure of this grade is $19, delivered. Small sales, totalling about 500 tons of malleable, have been done in this district and some of it is understood to have been closed at $20.58, delivered, or $18, Buffalo furnace.

### Many Foreign Inquiries

Cleveland, July 18.—The continued receipt of a varied lot of inquiries for steelmaking pig iron for export is the only feature that adds any liveliness to the market. Many of these inquiries give very positive evidence of lack of information concerning the iron trade in this country. It is difficult to tell what the actual tonnage desired amounts to, because it is clear that often the same inquiry is sent in by a number of different brokers or other representatives of foreign buyers. The local market is extremely dull. Labor troubles, causing scarcity of iron molders, is reducing the output of foundries, and is causing some consumers to request that shipments be held up.

### No Activity in Chicago

Chicago, July 18.—The inquiry for all grades of pig iron in the Chicago district is extremely light and prices remain the same in all cases. Southern pig iron still is quoted at $14.50, Birmingham, which makes possible delivery in Chicago at $18.50 per ton. Northern foundry iron continues at $19, furnace, and northern malleable is still quoted at $19.50, furnace. Dealers in pig iron are not deeply concerned about the prevailing dullness of the market, their apparent optimism being based upon their firm belief in the stability of the steel industry. They attribute the present weakness to the extremely hot weather and to the shortage in labor, two factors which they believe are having an effect upon the output of the mills. In spite of the fact that southern pig iron can be bought in Chicago at a price lower than that quoted for northern iron, there is no tendency among those who have northern iron to sell to make concessions. This condition, it is pointed out, will undoubtedly hold true until there is a greater demand for iron.

### Business Slack in St. Louis

St. Louis, July 18.—A sale of 400 tons of southern No. 2 foundry iron was about the largest transaction in the St. Louis district last week. Business seems to be somewhat at a standstill, as far as pig iron is concerned, and orders and inquiries are limited to car lots. Local sales agents seem to take courage in a wire order received today for one to two cars of southern iron for quick delivery. Whether this is for some shortage on contract, or an indication that business is about to break, could not be ascertained.

Southern No. 2 iron is held at $15, Birmingham basis, but resale iron can be had at $14. Northern iron is held at $19, Chicago and Ironton.

### Southern Iron Weak

Cincinnati, July 17.—One southern furnace has notified the market that it will sell No. 2 foundry iron at $14, Birmingham basis, for shipment over the next few months. Other southern furnaces are holding from $14.50 to $15 for this grade for 1916 and the first half of 1917. The southern market is undoubtedly soft. Resale iron is easily obtainable at $14, Birmingham basis for No. 2 foundry. The only sale of southern iron reported in the past few days was 400 tons of foundry iron to a St. Louis melter at $14.50, Birmingham basis, for No. 2 foundry, for July and August shipment.

Southern Ohio foundry iron is much stronger than the same grade from the south, as all furnaces in the Ironton district are well booked on basic iron. Northern Ohio No. 2 foundry is being held at $19, Ironton basis, for 1916 and the first half of 1917, but a very limited amount of resale iron can be had at $18.50. This latter lot is expected to be disposed of at any time. Southern Ohio silvery iron is quoted from $27 to $29, furnace, for 8 per cent silicon, and the same grade from the south is being given from $24 to $25, furnace, both for 1917.

### More Life in South

Birmingham, Ala., July 18.—A thorough canvass of the Birmingham pig iron situation the past week revealed the fact that inquiries have again begun to liven up. The different interests have quoted on several lots from 1,000 to 5,000 tons for last half delivery; and additional orders for foreign iron could be secured, were there any hopes for ocean bottoms. Inquiries for export iron have been good. From 8,000 to 10,000 tons of Birmingham foundry iron has been shipped through the ports of Savannah, Charleston and New Orleans since the recent lowering of ocean freights from $30 to $28 per ton, and it is the opinion of the well informed pig iron salesmen of the district that an immediate tightening up of the market would occur—now that the warrant iron on the market is insignificant—if the prospective export business could be taken care of. There has been a decided change for the better in the matter of establishing a more stable base price. While the furnace interests are emphatic in their avowal of the maintenance of base price of $15 for the rest of the year, yet sales at a lower price are heard of in sharp competitive territory, ranging from $14 to $14.50 per ton, No. 2 foundry basis. The 90,000 tons of southern warrant iron, which have been available for "peddling" for many months past have finally "dwindled" to a small proportion, and this fact will have a stimulating effect on the market.

### Warrants Slightly Stronger

New York, July 18.—Alabama pig iron warrants continue to show a slightly stronger position. Several thousand tons sold last week have helped to clear the situation of the lowest priced offerings. Inquiry is better, but the buyers still are bargain hunters and some of them are

(*For complete prices see page* 148.)

offering only $12.75 for No. 2 foundry. There have been some further sales at $13 for this grade. Spot warrants now are quoted at from $13 to $13.50 at warehouse in the Birmingham district for No. 2 foundry.

## Furnace Coke

*For Spot Shipment Advances Slightly—Heat Has Effect*

Pittsburgh, July 18.—A valley blast furnace interest, which covered estimated fuel requirements for the remainder of the year some time ago, has purchased an additional lot of 1,000 tons a month for shipment the last five months of 1916. The fuel involved was obtained at about $2.50, ovens. The scarcity of coke, caused by the observance of the holiday, July 4, and the extreme heat of last week, caused prices of blast furnace coke for spot shipment to advance slightly. Dealers are obtaining $2.75, ovens, for standard 48-hour coke for prompt shipment, although reports of sales at $2.65, ovens, are heard. The market for 72-hour fuel is quiet, but prices are firm. *The Connellsville Courier,* for the week ending July 8, says production was 359,530 tons, compared with 423,550 tons the week previous.

### Inquiries at Cincinnati

Cincinnati, July 18. — Inquiries for furnace coke continue to come into the market, but very little business is being placed. It is the opinion of dealers that furnaces are feeling the market with intentions of buying in the near future. Prices are fairly strong, and show no indication of changing in the next week or so. Wise county and Pocahontas furnace coke are quoted from $2.85 to $3.25, ovens, and New River grades from $3.25 to $3.50, ovens, all for contract delivery.

### Unusual Conditions

Birmingham, Ala., July 18.—Coke oven operations of the district have practically assumed normal shape since the recent heavy flood. The local demand, due to disturbed transportation facilities, was unprecedented. Material for the erection of the 37 Koppers by-product ovens at Alabama City for the Gulf States Steel Co. has been assembled and work has been begun in earnest on them. Contractors promise to complete the work by Jan. 1, 1917. Alabama coke is very active at $4.25 to $4.50 for foundry purposes.

George L. Padgett, manager of the Temple Malleable Iron & Steel Co., Temple, Pa., died at his residence at Reading, Pa., aged 43 years.

# Will the Ferro Be Shipped?

*This is the Important Question Which is Perplexing Many Who Have Contracted for the Rest of the Year*

New York, July 18.—Most of the larger buyers of ferro-manganese, it has become apparent, are covered against their requirements for the rest of the year on the basis of contracts now outstanding. Many of these contracts are with English producers, and if the latter are able to ship this metal, it is believed in the trade that there is not likely to be much additional buying for the current year's consumption. It still is an unsettled question, however, whether the English makers will be able to keep their shipments up to date. At present the situation is mixed. Some producers abroad are behind on their monthly quotas, while on the contrary, others have ben anticipating their obligations. Shipments, on the whole, are fairly satisfactory at present. There is very little buying of either foreign or domestic metal at this time, and prices are not solidly defined. It probably is significant that certain interests which were planning to turn additional eastern Pennsylvania furnaces to the making of ferro-manganese have been delaying the carrying out of these enterprises. Prices for either domestic or foreign, spot or forward material are around $175, seaboard. About 160 tons of domestic electrolytic metal which has been at New York for several weeks waiting sale now may be had at $175, New York. Unrestricted ferro-manganese for export, which means domestic metal, has been bringing some premiums and a sale of 25 tons for shipment to Sweden at $200, seaboard, is noted. There is an inquiry in the market for 300 tons from an Ohio consumer and one for 100 tons for nearby from a tack manufacturer in the Chicago district.

Some inquiries for spiegeleisen for foreign delivery continue to appear and small sales have been made at the price of $50, furnaces, for 20 per cent. This appears to be about the current price. An eastern Pennsylvania steelmaker is inquiring for 500 tons for shipment this year.

### Decline at Pittsburgh

Pittsburgh, July 18. — Ferro-alloys and steel making metals continue to decline gradually in price. Ferro-manganese for prompt delivery now is being quoted at a range from $175 to $200, seaboard, although dealers at this center claim no tonnage has been sold for nearby shipment at the minimum figure. Spiegeleisen, which had been held at $55 a ton, now is offered at $50 a ton and reports of that figure being shaded are heard. Steel making metals, after advancing to the highest price levels ever recorded, are being sold at more nearly normal prices. Tungsten ore, which commanded as high as $85 a unit for 60 per cent concentrates last February, now is quoted at $40 a unit, and that figure has been shaded in a number of instances. Consumers of bessemer ferro-silicon quietly are covering requirements for the early part of 1917, at prices for delivery this year.

(*For complete prices see page* 148.)

## Warehouse Stocks Low

Cincinnati, July 18. — The continued good weather for building purposes has greatly depleted stocks in warehouses in this city. Demand is heavy for all kinds of building materials, especially light structurals and reinforcing bars. Demand for sheets is not heavy, despite the fact that warehouse prices on blue annealed No. 10 gage, and black No. 20 gage, were reduced last week. The former is now quoted from 3.40c to 3.50c, and the latter from 3.25c to 3.40c, both f. o. b., Cincinnati. Cold rolled bars are quoted the list price, plus 10 and hot rolled bars from 3.20c to 3.75c. Shapes and plates are being held at 3.20c to 3.50c.

## Tubular Goods Quiet

Pittsburgh, July 18.—Specifications on contracts for tubular goods are described as heavy by makers in western Pennsylvania and eastern Ohio. Demand for oil country goods is heavy, but merchant pipe is comparatively quiet. Prices of all grades are being well maintained. No large orders have been placed this week in the Pittsburgh district.

## Canadian Ore Shipments

The Steel Co. of Canada, Hamilton, Ont., will have shipped to Sarnia, Ont., during the present season of navigation upwards of 500,000 tons of iron ore from the ranges near Superior and Duluth. This is the greatest tonnage ever ordered to be shipped via Sarnia and will consist of nearly a hundred ship loads. The ore will be loaded in cars at Point Edward and hauled to Hamilton.

# Implement Makers Are Aroused

*Not Satisfied With Concession of Three Dollars Per Ton on Steel Bars—Many Mill Representatives Deny That a 2.35c Price Has Been Named*

Chicago, July 18.—The demand for steel bars in the Chicago district is encouraging and inquiries continue to be noted to some extent. The prices which are more or less nominal remain at 2.69c, Chicago, for delivery at the convenience of the mill. Specifications are being received in a volume equal to shipments, the excess in specifications over shipments as noted last week, having diminished. Hard steel bars continue to be quoted at 2.50c and a medium volume of this business is being booked.

Representatives of steel companies in Chicago are at a loss to understand the reported sale of 80,000 tons of implement bars at 2.35c. There has been no effect in the west from this transaction and dealers intimate that, should the report be found true, few, if any, companies will make concessions.

The implement manufacturers are very much aroused over the reported purchase and they do not hesitate to brand the report as false. A representative of these manufacturers makes the statement that under present conditions in the implement industry, firms engaged in this business are unable to pay over 2 cents for bars. He pointed out that all of these western manufacturers secured their 1916 requirements at 1.90c. A few eastern firms, who were encouraged by the condition of their business about a year ago, bought at a price slightly higher than this. The same authority made the assertion that if the present weakness in the demand for farm implements continues throughout the remainder of the year, manufacturers will have a supply of bars on hand sufficient to carry them well into the first quarter of 1917.

### Seek 2.35c in East

Philadelphia, July 17.—Some of the eastern manufacturers of farming implements have been endeavoring to buy from independent mills for first half of next year at 2.35c, Pittsburgh, the price at which large tonnages recently were sold to western buyers by eastern producers. Thus far they have not been successful. Only one or two of the implement trade in this district require sizeable tonnages of bars. The falling off of specifications against third quarter bar contracts by consumers in this territory has continued. Makers generally report current orders against contracts are light. There also is very little new business. Some independent makers are soliciting contracts for first quarter of next year from the preferred trade, at 2.50c, Pittsburgh. Bessemer bars for comparatively early shipment are quoted at 2.50c, Pittsburgh. Nothing under this figure is heard.

### Steel Bars at 2.50c

Pittsburgh, July 18.—Manufacturers of steel bars in Pittsburgh refuse to be influenced by the report that agricultural implement manufacturers had covered requirements for the remainder of the year at 2.35c, or $3 a ton under the generally prevailing price. So far as can be ascertained, no mills in this district have made any concessions and the 2.50c price appears to be as strong as ever.

Demand for rounds for the manufacture of shells in this country is comparatively light and many people in close touch with the situation say that not many additional contracts for shells for Great Britain will be placed here. England, with her 3,000,000 men and women working in munition factories, is furnishing her armies and, to a considerable extent, those of her allies, with munitions, but will have to buy some semi-finished products in this country.

### Adhere to 2.50c

Cleveland, July 18.—The publication of the fact that sales of 80,000 tons of steel bars have been made at 2.35c, Pittsburgh, has aroused much interest in this section, but the uniform quotation of 2.50c is being adhered to. Whether this policy will long be maintained, remains to be determined, but no local office has been authorized to meet the 2.35c price. Agricultural implement manufacturers are not showing much interest, but evidently are awaiting developments.

### Chicago Iron Market Unchanged

Chicago, July 18.—Iron bars for delivery during the remainder of the year are commanding 2.50c, Chicago mill, while sales accompanied by specifications are being made at 2.35c, Chicago mill. There is some demand for bars at the latter terms, but only a small amount of business is being booked at the 2.50c price. Production of most of the mills is sold several months in advance and this, coupled with the fact that hot weather and labor shortage has curtailed the output, is thought to be responsible for the absence of a heavy demand for iron bars.

(*For complete prices see page* 148.)

### Hoops and Bands

Pittsburgh, July 18.—Steel hoops and bands continue to be offered at 2.75c and 2.50c, respectively, for delivery at the convenience of the manufacturer. Mills in this district are not in a position to promise material for quick shipment. New buying is comparatively light. but specifications against contracts have not fallen off. Deliveries are deferred from six to nine months.

Cotton tie manufacturers are shipping heavy tonnages to the south, and it is believed that contracts will have been specified against fully before the end of this month.

### Shafting

Pittsburgh, July 18.—Cold rolled steel shafting is being quoted at from 15 to 20 per cent off the list for delivery the remainder of the year. Most mills are not anxious to sell additional tonnages, having already disposed of the bulk of their output for this year. For prompt shipment, from 5 to 15 per cent off the list is being quoted. Warehouses are commanding list price and considerably above, although reports of abnormally high prices are not so frequent as previous.

## Cold Rolled Strip Steel

Pittsburgh, July 18.—Scattering lots of cold rolled strip steel are being sold for domestic consumption and for export, at prices ranging from 6c to 7c. For delivery at the convenience of the mill, makers are asking from 6c to 6.50c, base. A few days ago 200,000 pounds were sold at 6.25c, base, for export.

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The J. L. Mott Iron Works Co., Trenton, N. J., after having completed work on large shell contracts, has closed down its munitions plant. The officers of the company, however, say this action is only temporary, as it is expected that additional shell orders will be booked.

# Freely Specifying Plates

*Buyers Do Not Hesitate On Account of Higher Prices for Present Quarter—Strong Demand From Abroad*

Philadelphia, July 17.—Buying of ship plates for foreign delivery continues to be an important factor. An eastern Pennsylvania maker within the week sold 4,000 to 5,000 tons additional to Japan at 3.50c to 3.75c, Pittsburgh. Foreign users have paid 4c, Pittsburgh, for plates, as recently noted. There are many inquiries pending, some of which were new this week, from Japan, Italy and England especially and while undoubtedly there are some duplications, it is estimated that about 50,000 tons for export are before the mills. A tremendous demand for plates from domestic consumers also is maintained. Eastern mills which, beginning July 1, have numerous active contracts at 4c, Pittsburgh, report buyers have shown no hesitancy in specifying against these tonnages, although deliveries will not be forthcoming until well after Jan. 1, and in some cases not before the second quarter of next year. Some makers will not promise any shipments on new business before the second quarter of 1917. Some buyers only now are getting deliveries of steel specified last September and October. Strike conditions having improved in certain eastern fabricating shops and ship yards, plate deliveries which had been interrupted now are going forward freely. A Wilmington, Del., ship yard is inquiring for 2,400 tons of plates for first half of next year. Prices cover a spread of 3.50c to 4c, Pittsburgh, for shipment in accordance with mill conditions, the lowest figure being limited to makers who can furnish restricted widths.

### Boiler Plate Weak

Cleveland, July 18.—The weakest feature of the plate market is found in boiler steel and in some cases consumers allowed tonnages to be cancelled at the end of the second quarter, although prices for the third quarter are $15 higher. Other kinds of plate are strong and specifications are very fair.

### Prompt Plates Stronger

Pittsburgh, July 18.—Steel plates for nearby delivery, after reflecting some irregularity, now are being held at 4c. The most important mill to offer material recently for rather quick shipment, is understood to have filled up its order books, which accounts for the reappearance of premium quotations.

The Lehigh railroad is negotiating for from between 1,000 to 1,500 freight cars. The United States Steel Corporation last week placed contracts for 468 cars for by-product coke plants operated by the Carnegie Steel Co. Cars will be furnished by several car builders. Generally, demand for car material is not heavy.

Plates are being held at 2.90c for shipment at the convenience of the mill. No trace of that figure being shaded can be found.

# Steel for Shell Orders

*Is Still Needed—Foreign Buyers Making Strenuous Efforts to Place Business in This Country*

Philadelphia, July 17.—Although munition contracts for European belligerents now are being completed by various plants, and few renewals are being made, there still is considerable need of steel for this year's shipment to finish up shell orders. Eastern Pennsylvania steelmakers this week were asked to supply 5,000 tons of 8 to 9-inch blooms to a shellmaker, but declined the business because they could not deliver by Jan. 1, as desired. Inquiries for billets and other semi-finished forms for export are both numerous and quite extensive in point of total tonnage. Supplementing a recent sale of 1,000 tons of electric steel ingots to Italy by southern makers, as stated in these reports several weeks ago, there is a new inquiry for 3,000 tons of this quality from the same source. Domestic buyers are more active and have been inquiring for last quarter. A Lebanon, Pa., consumer has purchased 1,500 tons of 4-inch and under open-hearth billets for delivery this year at a reported price of $42 to $42.50, Pittsburgh. Eastern mill quotations on open-hearth steel are $45 to $50, Philadelphia, on rolling, and $65 to $70, Philadelphia, on forging steel.

### Foreigners Dominate Market

Pittsburgh, July 18.—Entente nations are scrambling for billets and sheet bars in this country. Agents of England, France and Italy literally are scouring the market for material and heavy tonnages, in the aggregate, are being sold for export. Jobbers are picking up all available tonnages of billets and sheet bars, which continue to be quoted at a range from $40 to $45, mill.

The domestic market for semi-finished steel products is more active than previously. Several sheet and tin plate manufacturers, who recently have increased the capacities of their plants, are supplementing contracts for sheet bars for delivery the remainder of the year. Talk again is heard of a shortage of material, but supplies at present appear sufficient to satisfy demand. Forging billets are listed at a range from $65 to $70 and wire rods are commanding from $60 to $65, Pittsburgh.

### Heavy Foreign Inquiry

Youngstown, O., July 18.—Heavy foreign inquiries for billets, sheet bars and slabs have been received in this district, but no sales have been made. Local producers are well sold up on semi-finished materials and only occasionally have small lots for sale. It is understood that $41 was offered for bessemer sheet bars by foreign interests, but without success. Heavier inquiries for sheet steel also are coming out, notably from England and France. Buyers for the allied nations have held back orders for some weeks. With prices showing little or no tendency to weaken, these buyers are now endeavoring to contract for a considerable tonnage. Insistence is still laid upon delivery in 1916. The mills generally are so well covered for last half business that it seems probable some shell steel orders will shortly be placed calling for delivery in the first half of 1917. The domestic market is quiet.

### Placed in Canada

Montreal, Que., July 18.—The Canadian Car & Foundry Co. has received an order from the imperial munitions board for 100,000 steel billets which will cost approximately $700,000.

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Robert Bacon, director of the United States Steel Corporation, has been commissioned a second lieutenant of the Twelfth New York Infantry, now on the Mexican border. Mr. Bacon has taken much interest in preparedness activities and has attended the civil military camps at both Plattsburgh, N. Y., and Oglethorpe, Ga.

(*For complete prices see page* 148.)

# Resale of Steel Shapes

## *Is Having Important Effect on the Market—Awards of New Buildings Not Numerous*

Philadelphia, July 17.—An increasing number of buyers of structural shapes, who are receiving deliveries at 1.75c to 2c, Pittsburgh, are engaging in the jobbing of this plain material to the general trade at from 2.50c to 3c, Pittsburgh, depending on the delivery. The sellers include fabricators who, with new work slack, are able to turn this steel at a considerable margin without putting it through their shops. This reselling is interfering with the trade of regular jobbers and also, in a degree, with that of the mills. The eastern structural mills gradually are bettering their deliveries, as they are shipping out old orders freely and fresh specifications against contracts are comparatively eager, owing to the high level of third quarter bookings. Some mills, which have sold against definite business and not on contract, report good specifications. The narrowing of delivery periods is not on all sizes, as certain sections are not being promised by eastern makers until January. New business is very limited, showing that high prices are a strong deterrent. Mill prices are from 2.50c to 2.75c, Pittsburgh, the best shipments running from two to three months.

### Activity in Fall Expected

Chicago, July 18.—A moderate demand for structural shapes continues to come from builders of small office and industrial structures, no business involving large tonnages having been reported. The American Bridge Co. will furnish 465 tons to be used for track elevation for the Illinois Central Railroad in Chicago.

A few manufacturers claim that activity among local architects in preparing plans for structural work forecasts an active business for the late fall and winter. Leading contractors in Chicago are of the opinion that the recent verdict, which convicted 14 labor union agitators will have an influence upon building in Chicago. They assert that building permits have already increased in number appreciably. As yet, this has had no effect in the inquiry for structural shapes.

### Quiet at Pittsburgh

Pittsburgh, July 18.—The market for structural material is seasonably quiet. It is not likely that demand for ships will be active in July or August. No large structural contracts have been placed in this district this week. Beams are being quoted at 2.50c, for delivery at the convenience of the mill. Occasionally, reports of sales at that price for nearby shipment are reported.

#### CONTRACTS AWARDED.

Illinois Central Railroad Co., track elevation bridges, Chicago, 465 tons, to American Bridge Co.

Chicago & Western Indiana Railway Co., bridging for Eighty-seventh street subway, Chicago, 219 tons, to American Bridge Co.

General Electric Co., crane runways for buildings, 26 and 28, Fort Wayne, Indiana, 211 tons, to American Bridge Co.

Ninth Church of Christ, Scientist, Chicago, 143 tons, to Milwaukee Structural Steel Co.

Gary Land Co., steel and concrete bridge over Calumet river, Gary, Indiana, 123 tons, to American Bridge Co.

Extension to plant of Carpenter Steel Co., Reading Pa., 300 tons to the Eastern Steel Co.

Building for the General Chemical Co., Marcus Hook, Pa., 1,200 tons to the Hadden Iron Construction Co.

Building for Syracuse Journal, Syracuse, N. Y., 150 tons to Smith & Caffrey.

Addition to foundry at Cortland, N. Y., 100 tons, the Jones & Laughlin Steel Co.

Warehouse for Stone Bros., Cleveland, 325 tons reinforcing bars to the Interstate Iron & Steel Co., Boldt Low Construction Co., general contractor.

New plant of Elyria Iron & Steel Co., Cleveland, 200 tons, to the Massillon Bridge & Structural Co.

#### CONTRACTS PENDING.

Sugar Mill, Hayti, 1,000 tons, bids being taken.

Pulp mill for the Chester Paper Co., Chester, Pa., 200 tons, bids being taken.

Four or five pulp mills in Quebec and Ontario, about 800 tons, bids being taken.

Beams for the New York Connecting Railway, 400 tons, bids being taken.

Department store for La Salle & Koch Co., Toledo, about 4,000 tons; bids on general contract due July 20.

Building for the Anderson Galleries, Inc., Madison Ave., New York City, 2,000 to 3,000 tons. Bids being taken.

Factory building for Roth & Co., Newark, N. J., 400 tons, bids being taken.

Two Levy apartments, one at 78th and Park Ave., and the other at W. 50th St., New York City, 500 tons each. Bids being taken.

## Inquiring for Shell Steel

New York, July 17.—Domestic makers of munitions are inquiring more freely for shell steel and it is stated that these matters aggregate 50,000 tons or more. Many of these negotiations were opened during the past week. It is interesting to note that these buyers who up to this time have not been interested in steel except for exclusively 1916 shipments now are willing to contract for their requirements for delivery beginning in October and November and extending well into next year. Certain implement manufacturers are figuring more actively on their steel bar requirements for delivery during the first half of 1917, and are endeavoring to develop a price of 2.35c, Pittsburgh, at which large sales have been made by leading makers to important middle western manufacturers, as reported in last week's issue.

(*For complete prices see page* 148.)

## Buffalo Pig Iron

### *Shows Increase in Inquiry During the Past Week*

Buffalo, July 18.—The inquiry for iron of the various grades became more general in the past week, according to the furnaces of the Buffalo district. While the volume that appeared in the market was not large from the tonnage viewpoint, the scattered character of the inquiry gave evidences of an increasing interest for future needs. This inquiry kept up for about four days and then subsided as the tonnages sought seemed to find placement with smaller producers and furnaces outside of the Buffalo territory.

Little or none of the iron was booked here because of the generally sold up condition of the Buffalo district stacks and the lack of a disposition on their part to meet the prices sought by the melters. It is evident that producers other than the larger interests here are more eager to book tonnages than are the Buffalo furnaces.

Prices for last half needs and for the early part of 1917 remain about the same as previously quoted, with the range being from $18.25 as the minimum on the low grades to $19.25 as the maximum on the higher grades, with No. 2X being quoted at $18.50 to $19 and basic at $19.50 to $20.

## Canadians Are in Market

Buffalo, July 18.—Canadian agricultural implement manufacturers have come into the market for contract needs on implement bars, but the mills and agencies of the Buffalo district have met this inquiry by declining to make concession prices to secure the business. The price here is being maintained firmly at 2.50c base.

A number of the contract customers have sought to get additional tonnages on the mill books, but the mills are holding the consumers to their contract allotments.

# Sheet Prices Fluctuate

*Galvanized Product Affected By Price of Spelter —Deliveries Are Improving*

Youngstown, O., July 18.—Increased interest in galvanized products continues to enliven an otherwise dull sheet market. While the amount of spelter-coated sheets sold during the past week was not large, it was well above the tonnage taken in any previous week this year. The roofing trade, normally the largest consumer of the output of the galvanizing departments, has not figured in this buying, which was done largely by consumers who desired the sheets for immediate use. The price of galvanized sheets, No. 28 gage base, continues to follow the fluctuations of the spelter market. The increased stiffness in spelter prices in the past few days led one mill late yesterday afternoon to withdraw its 4.25c price in favor of a minimum of 4.35c. Sales have been made at as low as 4.10c, this figure being made on a Pacific coast order. Any further advance in the cost of spelter is certain to entail a sympathetic rise in prices for galvanized sheets, as with quotations on black sheets practically stationary, the cost of the coating is the determining factor in fixing galvanized prices. Spelter's decline in recent weeks has aroused interest among those mills which have not operated their galvanizing departments for months. The opinion is freely expressed that a decline in spelter prices to 7 cents would bring these mills actively into the market. On the other hand, some buyers of spelter do not believe that prices will fall lower. Sellers of spelter point out that increased labor costs in both the mining and refining departments make it unlikely that spelter will fall to the ante-bellum level.

The demand for black sheets continues light. One sale from stock was made this week at 2.75c, but this transaction entailed special conditions. Odd and irregular sizes on warehouse floors can be picked up for prices far below the 3c level, at which the bulk of the black sheet business is moving. The sustained lull in black sheet buying has caused some slight weakness to develop, but present high cost levels of raw materials and labor have a strengthening influence on prices.

Blue annealed grades, particularly in the large sizes of the heavier gages, continue in good demand. Most mills are sold ahead for weeks on this class. Instances are encountered where No. 10 blue annealed has sold at 3c, while other mills are holding firmly to the 3.25c price, which has ruled for this gage for some weeks. In this grade, as in other lines of sheets, each inquiry is considered separately and each mill quotes according to its own condition as to sizes and schedules of the different mills. As a result, a wide divergence in quotations usually marks each inquiry.

### Sheet Deliveries Better

Pittsburgh, July 18.—Quicker deliveries of steel sheet products are being promised by a number of mills that have been able to catch up in shipments by operating plants at maximum capacity for a long period. As might be expected, abnormally high prices for prompt delivery have disappeared to a considerable extent, although base prices have not been reduced.

Galvanized sheets are selling at as low as 4.25c, base, as the result of sharp declines in the price of spelter. Coated material is being shipped at as high as 5c, base, and that figure would be reestablished quickly if spelter advanced in price to any appreciable extent. Some mills continue to ask 3.05c for No. 10 gage bessemer blue annealed sheets, but reports of sales at 2.90c are heard. Blue annealed products, for prompt shipment, had commanded as high as 3.50c. Black sheets continue to be offered at a range from 2.90c to 3.15c, for No. 28 gage.

Many of the more important consumers are attempting to buy tonnage for delivery the early part of next year, and some material has been sold for 1917 shipment. Most mills have enough tonnage on their books to maintain present rates of operation the remainder of this year, although a few sellers are anxious to dispose of additional tonnages before Dec. 31.

### Eastern Prices are Easier

Philadelphia, July 17.—Inquiries for sheets for next year's delivery are beginning to come before eastern producers. There is fair buying activity in the market and specifications are satisfactory. Prices have eased up somewhat in that 3.50c to 3.75c, Pittsburgh, now is quoted by eastern Pennsylvania makers against 3.75c to 4c recently, for No. 10 gage, blue annealed. There has been no 4c business in some weeks.

### High Sheet Bar Prices

Cleveland, July 18.—The sheet market presents some unsatisfactory features, as mills are compelled to pay $44 for sheet bars and prices are not entirely regular. Demand is of only moderate volume.

### Market Quiet

Chicago, July 18.—In general there is not much demand for steel sheets, although there is some small activity in the heavier grades. No. 28 gage black and No. 10 gage blue annealed continue to rule at the former prices, 3.09c and 3.19c, respectively. Galvanized sheets, No. 28 gage, are quoted at 4.49c, Chicago.

### Tin Plate Firm at $6.

Pittsburgh, July 18.—Owing to the fact that tin plate manufacturers in this country have disposed of their output for 1916 delivery, the general market is quiet, but prices continue to stiffen. No trace of quotations below $6, base, can be found. Foreigners daily are sending out inquiries for heavy tonnages of tin plate, but most of the export tonnage is not receiving any consideration, owing to the inability of mills to incur additional obligations.

(*For complete prices see page* 148.)

# Wire Advance

*Is Expected and Specifications are Coming in Freely*

Pittsburgh, July 18.—Specifications against contracts for wire products have been coming out in heavier volume the last few days, due to the fact that an advance in prices has been expected for a fortnight. Last week, it will be recalled, manufacturers' wire was put up to $2.65, but plain fence wire continues to be quoted at a minimum of $2.45. Wire nails are being offered at $2.50 a keg. Reports from salesmen traveling in all sections of the country indicate that stocks are low.

Details of Russia's huge order for barb wire have not been learned here. Russia sent out inquiries for approximately 200,000 tons of barb wire and it is believed that a large portion of the tonnage has been purchased.

### Advance to Manufacturers

Cleveland, July 18.—The demand for wire products is extremely heavy and leading companies which had been quoting $2.45 on plain wire to manufacturers are now quoting $2.65. The demand for flat wire is especially active and deliveries are greatly delayed.

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W. B. Enck, who has been purchasing agent of the Pennsylvania Steel Co., with headquarters at Philadelphia, has been made purchasing agent of the Donner Steel Co., Buffalo, and now is located in the latter city.

# Scrap Shipments Delayed

*In the Cleveland District—Market in Most Centers Shows Little, if any, Improvement*

Cleveland, July 18.—Impediments to shipments of scrap are proving to be serious handicaps to the natural action of the local scrap market. Labor scarcity in the mills of consumers prevents the unloading of scrap with the speed necessary to dispose of shipments as fast as they are received, and consequently orders have gone out to delay further shipments until troubles are dispelled. A great deal of scrap has been sold, and is now waiting to be delivered.

A spell of quietness among dealers was experienced the past few days. Prices are firmly held, with few changes either up or down. Old steel rails over 6 feet long have dropped to $14.25 to $14.50 a gross ton. This is ascribed again to scarcity of labor required to cut them into shorter pieces before they can be used in furnaces. Since heavy melting steel is not moving to consumers in sufficient volume to establish a price, a wide range is quoted $14.50 to $15.50. Offers of $15 are reported from local mills. No. 1 busheling and No. 1 railroad wrought virtually have no market at present. Some dealers predict little change will take place in the prevailing prices for the next two or three weeks.

### Scrap Marking Time.

Pittsburgh, July 18.—The market for old materials, after considerable excitement, again is marking time. No large tonnages have been sold since the Carnegie Steel Co. and the Jones & Laughlin Steel Co. concluded negotiations for a total of about 60,000 tons. Heavy melting steel is quotable at a range from $16.50 to $17.25, delivered. Rather heavy tonnages of turnings and borings are being shipped to blast furnaces. Mixed turnings and borings have been purchased at less than $8; machine shop turnings are commanding from $8.50 to $8.75 and borings are selling at a range from $8.50 to $9. Bundled sheet scrap has declined 50 cents a ton to $12.50. Moderate strength is reflected by other grades, although prices have not been severely tested recently.

### Still Disinterested

Philadelphia, July 17. — The scrap market in this territory has failed to respond by any expansion of trading to the better tone which recently developed from the large sales of heavy melting steel in the Pittsburgh district. Eastern consumers continue disinterested, regardless of the present attractive level of certain grades and in some cases there have been cancellations of unshipped portions of forward contracts, one of these involving part of an order for 4,500 tons. Pittsburgh brokers have completed their buying in the east against the recent orders from the steel works there and are out of the market. As high as $17.25, delivered, was paid eastern producers of steel scrap by Pittsburgh consumers. One eastern Pennsylvania steel works recently bought several thousand tons of heavy steel at $15, delivered, and now is offering but $14.50, delivered, which, however, is under the market. Small sales of low phosphorus have been made at $20, delivered. Re-rolling rails have brought $17.25 to $17.50 from eastern Pennsylvania consumers.

### Dealers Encouraged

Cincinnati, July 18.—Iron and steel scrap dealers are beginning to feel a little more encouraged, because a few sales made during the past few days in Youngstown, O., and several small eastern towns, brought slightly better prices. A sale of stove plate was made at $8.75, per net ton, and heavy melting scrap sold at $14.50, per gross ton, both f. o. b., Cincinnati. Inquiries in this immediate territory are not worth speaking of. Shipments on old contracts to nearby consumers are not fully up to requirements, which fact has caused stocks in dealers' yards to accumulate in the past two months. Dealers here are a little more optimistic than they have been for a long while, as they feel certain that better conditions now existing in several nearby districts, will soon have a good effect upon the market here.

### Chicago Scrap Quiet

Chicago, July 18.—In general the scrap market in the Chicago district is quiet, the effect of a purchase of 30,000 tons of steel scrap for the Gary plant having died down considerably. This sale, however, has served to sustain prices. Brokers who bought moderately on the strength of the Gary transaction are finding few sales.

Railroads are offering extremely light tonnages, only three lists having been noted this week. The Michigan Central Railroad offers 2,000 tons, Great Northern Railroad, 3,000 tons and the Northern Pacific 1,600 tons.

### All Grades Advance

St. Louis, July 18.—The heavy tonnage of melting steel recently sold to the Steel Corporation at Gary and the Inland Steel Co. at East Chicago has stiffened the market here, and all grades have advanced in price from 25 to 50 cents a ton. Consumers, however, are still refusing shipments on old contracts and are not making any new commitments.

Nevertheless, the market has turned for the better, and dealers look for much better prices within the next few weeks. The only railroad offering before the market is a small list from the C., P. & St. Louis, calling for 200 tons.

### Prices Decline

Birmingham, Ala., July 18.—The old material market has shown further evidence of weakness and inactivity. Prices are off on stove plate, machinery and melting steel. Prices on old carwheels and steel axles and forging steel of all kinds remain the same, and a particularly high level is maintained on axles.

(*For complete prices see page* 148.)

# Rivet Prices

*Are Being Shaded in the West—Small Sizes are Very Scarce*

Pittsburgh, July 18.—The market for rivets at Pittsburgh, unlike the situation at Chicago, appears to be satisfactory. Manufacturers say they are having no difficulty in obtaining 4c for structural rivets. In the west, supply houses are shading prices to a considerable extent, by offering material purchased at lower figures some time ago. It is not likely that prices of nuts, bolts or rivets will be advanced shortly, unless manufacturers of bars put up their quotations.

### Advance of a Year

Cleveland, July 18.—The scarcity of small rivets is an interesting feature of the market and it seems almost impossible to obtain delivery in less than five to six months. Very little contracting for either boiler or structural rivets is being done. Prices are about $50 per ton higher than they were a year ago and buyers are not showing disposition to take on additional tonnages.

The Nickel Plate railroad is in the market for 400 kegs of track bolts.

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The Quick Action Ignition Co., a corporation recently formed under the laws of Indiana with an authorized capital of $450,000, has taken over the business and assets of the Knoblock-Heidman Mfg. Co. The new company starts with ample cash capital and with facilities for largely increasing the business of manufacturing ignition apparatus.

# Railroad Buying

*Is Very Light—Few Inquiries for Cars are Pending*

New York, July 18.—New steel business from railroad sources has been quieter following the recent completion of a large Russian rail order which has taken many of the mills out of the market on rails until about the mid-year of 1917. The portion of the Russian order finally received by the Cambria Steel Co. was 165,000 tons, or slightly larger than previously stated. The Bethlehem Steel Co. also will roll 60,000 tons of this order, under an arrangement made with one of the other mills which received an original contract. A number of other foreign rail inquiries continue in the market.

A few more inquiries for cars are stirring, but the market is not appreciably more active. The Lehigh Valley continues to figure on 1,500 box cars or box car bodies. The large Russian car order still is suspended, though builders feel confident that early action is likely. Locomotive orders, including two for the Togoland Military railway in Africa and one for the Bangor & Aroostock railroad to the American Locomotive Co.

The Western Maryland railroad has ordered 2,250 kegs of standard spikes for forward delivery, part of which went to Pittsburgh makers. The Seaboard Air Line continues to negotiate for 5,000 to 10,000 kegs. Spike prices for early or forward delivery are around 2.65c, Pittsburgh.

### Track Equipment

Pittsburgh, July 18.—The market for track equipment is decidedly quiet in western Pennsylvania. Railroad spikes, which have been somewhat weak and irregular, are still commanding from 2.65c to 2.75c for standard sizes. No large orders have been placed recently and specifying is not so brisk as previously. Other track equipment is quiet, but unchanged in position.

### Few Car Inquiries

Chicago, July 18.—Although inquiries for car materials continue to be noted in the Chicago district, only a small amount of actual business is reported. The Chicago, Milwaukee & St. Paul Railroad has announced its decision to build 1,100 wooden box cars at its shops at Milwaukee. This undoubtedly is another case wherein a carrier has resorted to the construction of wooden cars on account of the difficulty in securing prompt shipments of steel. The Chicago & North-Western Railroad is inquiring for 200 narrow gage mine cars. The Duluth, Winnipeg & Pacific Railroad has placed an order for 750 box cars with the Haskell & Barker Car Co.

### Rail Prices Firm

Chicago, July 18.—Prices for rails and track fastenings remain firm, due to an encouraging export demand reported in these columns last week. Domestic business is not active, the demand for light rails having slackened considerably. Most of the manufacturers are little concerned over the apparent weakness of the domestic market, owing to the fact that their production for the remainder of the year is practically sold out.

### Southern Pacific Rails

Birmingham, Ala., July 18.—A total of 80,000 tons of steel rails has been awarded to the Tennessee company here by the Southern Pacific lines for delivery during the second and third quarters of 1917.

### Heavy Buying Expected

Ottawa, Ont., July 18.—Representatives of Canadian car manufacturing companies have been conferring with members of the imperial munitions board at Ottawa for the past few days, and it is reported that announcements of large awards for cars will be made within the next few days. The cars are to be manufactured for the Russian government, but the placing of the contracts and the financial arrangements are in charge of the imperial munitions board. The only question to be settled is as to whether the companies in question, which include the Canadian Car & Foundry Co. and the National Steel Car Co., will be able to begin handling the work soon enough to make deliveries within the time limit. So far as is known, this is the first occasion on which Russian orders have been handled by the imperial munitions board, and it is understood that this but marks the commencement of this practice, which will probably prove more satisfactory than previous methods to all concerned. In addition to its importance as affecting the munitions business this change also promises to prove a stepping stone in the development of a big trade between Canada and Russia. While little has been published recently regarding the orders placed by the imperial munitions board the recent announcement that the $75,000,000 credit advanced late in the winter has been exhausted was an indication of the manner in which companies handling war orders were benefitting, and the extension of further credit of $25,000,000 is likely to be followed by another of similar amount at an early date.

### More Rails Received

Ottawa, Ont., July 18.—It is announced that the Canadian Pacific Railway is in the market for an additional 30,000 tons of rails and the Canadian Northern railway for 50,000 tons.

(*For complete prices see page* 148.)

# New Bar Card

*Is Issued by Carnegie Steel Co.—Number of Changes are Made*

New York, July 18.—A new steel bar card in which are incorporated a number of changes both in the classifications and in the extras has been prepared and issued by the Carnegie Steel Co. under date of July 1. This card as in the past, quotes net extras. Some of the leading independent makers of merchant bars who have been quoting one-half of double extras shown on their card have adopted the new card of the Carnegie Steel Co. and henceforth will name net extras. This will tend to harmonize the general practice. The last previous bar card issued by the Carnegie Steel Co. was in 1909.

# Floods in South

*Seriously Curtail Corporation Production —Rail Orders*

New York, July 19. (By wire.)—Floods in the south the past week or 10 days have seriously curtailed iron and steel production. The Corporation's output in the Ensley district has been cut fully 50 per cent during that period. The Corporation is not selling iron from the south at present, but is working furnaces largely on basic for its own use.

Small rail orders of the week to the Corporation were about 18,000 tons, including 1,000 for the Illinois Central, 1,000 for the Havanna Central, 3,000 to another line and scattering.

Tin plate demand is heavy.

## Machinists Strike

Chicago, July 19. (By wire.)—Twelve hundred Allis-Chalmers Mfg. Co. machinists struck Tuesday for an eight-hour day, and were followed by a walkout of 200 employes of the Pawling-Harnischfeger Co. and 15 machinists of the Stroh Die Molded Casting Co. Tuesday evening, 200 machinists of the Nordberg Mfg. Co. voted to strike.

Col. William C. Skinner has been elected president of Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., succeeding Charles L. F. Robinson.

# Great New Construction Program

*Announced By Bethlehem Steel Co. Will Include Important Additions at South Bethlehem, Steelton and Sparrows Point and Involves an Expenditure of $70,000,000*

New York, July 18.—A new construction program, more elaborate by a considerable margin than ever before undertaken at one time by an independent steel company in this country, has been launched by the Bethlehem Steel Co., and this will center about its original plant at South Bethlehem, Pa., and about the newly-acquired properties at Steelton, Pa., and Sparrows Point, Md., formerly operated by the Pennsylvania Steel Co. These improvements will involve a total expenditure of more than $70,000,000 and will comprise roughly 12 new blast furnaces, at least one entirely new steel works, as well as additions to existing steel-making capacity, numerous new blooming, billet and finishing mills, some of the latter in new lines not heretofore included in the products of the three works, by-product coke plants, enlargements of present ship yards, greater facilities for the handling and treatment of iron ore and various other auxiliary extensions and betterments. Work on this complex scheme of new productive capacity already has been inaugurated and will be pushed to completion with the utmost dispatch.

President E. G. Grace, of the Bethlehem Steel Co., has outlined to *The Iron Trade Review* the general plans of improvement as they have been developed up to this time.

One of the most extensive undertakings will be the broadening of the former plant of the Maryland Steel Co. at Sparrows Point into a great tidewater works. This construction will consist of the building of four modern blast furnaces of the largest capacity, increasing the present group to eight; sufficient new by-product coke capacity to balance off the new furnaces; a complete new open-hearth steel works, consisting of three or four 200-ton tilting furnaces; intermediate and finishing mills for the production of merchant bars, tin plate, sheets, plates and rods; material increase in the facilities for the handling and treatment of Cuban iron ores, the latter of which is carried on entirely in Cuba at present; and the expenditure of about $3,000,000 in enlarging the present ship yard. The total cost of the improvement at Sparrows Point will be approximately $30,000,000.

The betterments at Steelton will comprise the construction of four new blast furnaces to replace some of the present obsolete types which will increase the group to five modern stacks. Two of these now are under construction. The furnaces will have complete new auxiliary equipment. New by-product coke ovens and a new power plant for all departments of the works will be built. In the steel plant, a 200-ton tilting open-hearth furnace, which will be a duplicate of the present unit, will be installed, and there will be a new blooming and billet mill layout, as well as numerous smaller finishing mills. When these changes are completed, the Steelton works will have a monthly output of 75,000 tons of finished product. The cost of the Steelton improvements will be from $10,000,000 to $12,000,000.

### *Extensions at South Bethlehem*

The extensions at South Bethlehem will be spread over a longer period than those at Sparrows Point and Steelton. Four new blast furnaces will be built to the Saucon plant, as well as further open-hearth steel-making capacity. Additional structural shape mills will be added. More semi-finished steel capacity is in contemplation, as well as a large ingot mold foundry to supply the eastern trade and possibly later a car building plant will be built. Some parts of the plans for new work at South Bethlehem are not clearly defined as yet, but an expenditure of approximately $30,000,000 is in mind.

### *Changes in Personnel*

Under the plan by which the Bethlehem Steel Co. came into possession of the plants of the Pennsylvania Steel Co. and of its subsidiary, the Maryland Steel Co., the stock of the former company was purchased outright and was retired, and the Pennsylvania Steel Co. was dissolved. This automatically wiped out the organization of this company and made Steelton and Sparrows Point properties of the Bethlehem Steel Co., by which they will be managed and operated. A number of changes in the personnel of the old Pennsylvania Steel Co. organization consequently have been brought about. President E. C. Felton, of the Pennsylvania Steel Co., and Frank Tenney, secretary and assistant to the president, have retired. Mr. Felton has been president of the company since 1895. F. W. Wood, who has been president of the Maryland Steel Co., has been given increased duties and the management of larger operations in charge of the Sparrows Point plant, and will have the title of general manager. S. Anderson will be manager of the Sparrows Point ship yard. Quincy Bent is appointed general manager of Steelton. Frank D. Carney, who was the former superintendent of the Steelton plant, will take up his headquarters at South Bethlehem, where he will have charge of metallurgical matters for all interests. M. J. Scammell becomes general superintendent of the steel plant at Sparrows Point. To handle the bridge shop work formerly carried on at Steelton by the Pennsylvania Bridge Co., of New Delaware, the Bethlehem Steel Bridge Co. has been organized. George H. Blakeley, head of the structural sales department of the Bethlehem Steel Co., becomes president of the bridge company. Thomas Earle, formerly superintendent of the bridge shop, becomes vice president of the bridge company, and Carl B. Ely, formerly assistant superintendent of the bridge shop, is made superintendent.

It is understood that the management of the Bethlehem Steel Co., since taking over these plants, has been agreeably impressed by the physical condition of the properties acquired from the Pennsylvania Steel Co.

# Pressing Question

*Relates to Prices to be Fixed by British Government*

Office of *The Iron Trade Review*,
Princes Chambers,
Birmingham, Eng., July 8.

All branches of the iron and steel industry are affected by the delay of the ministry of munitions, in the expected reply to the application for an advance in maximum prices. The makers are much disappointed that the end of the month should have been reached without a definite announcement. They were very confident of success when a concession was made to the coke makers. But it is now recognized that any advance will be made with reluctance, and there is some basis for the pessimistic belief that no advance will take place. It will be a bitter disappointment if this forecast should prove correct. The price of Cleveland pig iron is now about 87s 6d ($21.00) but bookings are for the third quarter, makers having no iron for immediate shipment. A little relief has come, owing to the fact that, for some reason, pig iron is somewhat more plentiful in Scotland than in other districts and Cleveland iron sent north is now diverted to other markets. In view of the great scarcity of hematite, several other furnaces are to be blown in, for the production of steel-making iron. It is recognized that some substantial addition to the output of this material must be made. Business in East Coast hematite has practically ceased, for the present. But the nominal quotation is 122s 6d ($29.40) for home consumption and 140s ($33.60) for export.

The pressing question at the moment is that of prices. One of our most important pig-making firms in the Tipton district made a loss of £3,000 last year, and this is being extensively quoted as showing the unprofitable state of pig iron production. The grant of 15 per cent advance to South Wales miners is expected to bring an additional cost upon the manufacture of pig iron, and, at many of the furnaces, there is great concern as to the future.

### Finished Iron and Steel

To some extent the finished department will be affected by the decision the government authorities may take with regard to prices. The makers of finished iron have made representations on their own account, in the hope of getting the maximum raised; but some of them are not very hopeful about the result, and there is some foundation for the suggestion that this application has a certain precautionary character, in view of the demand of the pig makers. On the whole, it seems that this appeal has rather less chance of success than that in regard to pig iron. It is not disputed that finished iron prices are very good, but the small output constitutes a serious set-off to price advantages. The more favorable position of the war has probably had an influence in restraining price advances.

The galvanized sheet trade has benefitted a little from the slight fall in the price of spelter. But sheet bars are so difficult to obtain that production is restricted, and the selling figure is maintained at £28 to £30 per ton. The manufacturers are looking forward to somewhat better supplies from America, now that freights are likely to be reduced. Very great importance is attached to the reduction of insurance rates from £3 to £1 per ton, between New York and Liverpool. There has been a little improvement this week both as to supplies and prices of American material. Sheet bars are coming in at £9 ($43.20) to £9 10s. ($45.60) per ton and larger supplies of ingot steel, wire rods, billets, etc., will be welcomed by finished mills generally. Most of the British makers have booked this year's output, and have withdrawn their quotations. The users of raw steel are more dependent than ever upon foreign supplies, and will eagerly do business whenever this is found possible.

## Scarcity of Manganese Ore

United States Counsel Talbott at Brunswick, Germany, reports as follows:

"Since the outbreak of the war, the demand for iron products has been so great that the industry in Brunswick district has been very prosperous. One of the greatest difficulties with which the manufacturer has had to contend is the scarcity of manganese, which is mostly imported. The ore used by the Isleder Hutte, a plant in this consular district near the city of Peine, is so rich in manganese that it is now shipped to other plants in Germany as a substitute for the imported mineral. The demand has been so great that the greater part of the village of Adenstedt with its church has had to be demolished. The Ilseder company has just declared a dividend of 33 1/3 per cent, which the annual report just published says was principally earned by the sale of this ore, as the sale of the manufactured products of the company has not been more than two-thirds of that in time of peace."

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The Petroleum Refining Co. has awarded a contract to the Petroleum Iron Works, Sharon, Pa., for an oil refinery, to be built near Houston, Texas. The refinery will cost about $1,000,000.

(*For complete prices see page* 148.)

# Benzol Shipments

*Are Being Made in Large Quantities, But New Sales Are Light*

New York, July 18.—Heavy shipments of pure benzol continue to be made by producers, but new sales are restricted because there is little surplus product to be offered above contract obligations. Such buying as is being done is where makers find they have some excess over their shipping requirements and this is readily disposed of in the spot market at around 75 cents per gallon at the recovery plant. The spot benzol market continues strong, owing to the steady demand, but there is little action in contracts at this season. The toluol market has developed no new features and while there is considerable prospective business in the form of inquiries from foreign buyers, few sales are being put on the books. These foreign buyers still appear merely to be sounding the situation. Toluol prices at present are nominal. Offerings of solvent naphtha continue more liberal and sales are going at unchanged prices.

Most of the yearly contracts for sulphate of ammonia now have been closed by the fertilizer manufacturers and the buying season is approaching a close. The season's contract turnover has been larger than ever before, owing to the heavier production now possible in the country and the continued exclusion of imported material. A heavy year in this product is expected, as stocks left over from last year are relatively light.

The current quotations per gallon at the maker's plant on leading coke oven by-products, are as follows:

| | |
|---|---|
| Pure benzol, spot | $0.75 to $0.80 |
| Pure benzol, contract | .70 |
| Toluol, spot | 4.50 |
| Toluol, contract | 4.50 |
| Solvent naphtha, spot | .45 |
| Solvent naphtha, contract | .40 |

Sulphate of ammonia is $3.25 to $3.35 per 100 pounds at tidewater for both spot and contract.

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**Coal in Open Hearth.**—The Raymond Bros. Impact Pulverizer Co., Chicago, recently has received an order for the Carnegie Steel Co. for 17 of its largest size mills to pulverize coal for use in its open-hearth furnaces. The company is extremely busy at the present time and is highly gratified with the outlook for the demand for its mills.

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The Carpenter Steel Co., Reading, Pa., has purchased a tract of 68 acres of ground near its present plant to take care of future extensions. This company has been enlarging its capacity rapidly in recent months, having erected several large additions.

# Wage Agreement

*Of Tin Workers Expires Aug. 1—Conference to Set New Schedule*

In accordance with the wage agreement for the year ending June 30, 1916, bar iron mill employes working under wage scales of the Amalgamated Association of Iron, Steel and Tin Workers will be paid on the 1915-16 basis until Aug. 1. If scales for the year beginning July 1, last, have not been adopted before Aug. 1, it is possible that mills controlled by the Amalgamated Association will close down, pending the wage settlement. Officers of the association and representatives of bar iron manufacturers will meet at Detroit next Wednesday in a second effort to agree upon wage scales for the year ending June 30, 1917. At the Atlantic City conference, it will be recalled, manufacturers rejected proposed scales of the association, which provided increases in pay of about 15 per cent above those offered by the scales which went into effect July 1, 1915.

**Tin Plate Prices.**

The average invoiced selling price of tin plate was taken from the sales sheets of the National Enameling & Stamping Co., the Trumbull Steel Co. and the Carnahan Tin Plate Co., for the 60-day period ending June 30, last. The examination developed an actual sales average price of $3.90 per base box of 100 pounds, coke tin plate. This average is eight per cent above new prices contained in the 1916-17 scale and 12 per cent above wages provided by the 1915-16 scale.

The following concerns nave signed the sheet and tin plate wage scales for the year ending June 30, 1917, of the Amalgamated Association:

**Signed Scales.**

American Rolling Mill Co., Middletown, O.

Newport Rolling Mill Co., Newport, Ky.

Whitaker-Glessner Co., Creek Mill Plant, Wheeling, W. Va.

Whitaker-Glessner Co., Laughlin Plant, Harpers Ferry, O.

Briar Hill Steel Co., Empire Plant, Niles, O.

Briar Hill Steel Co., Thomas Plant, Niles, O.

Western Reserve Steel Co., Warren, O.

Trumbull Steel Co., Warren, O.

Carnahan Tinplate Co., Canton, O.

National Enameling & Stamping Co., Granite City Plant, Granite City, Ill.

National Enameling & Stamping Co., St. Louis Plant, St. Louis, Mo.

Follansbee Bros. Co., Follansbee, W. Va.

Youngstown Iron & Steel Co., Youngstown, O.

De-Forest Sheet & Tinplate Co., Niles, O.

## Coal and Coke in Alabama

The output of coal in Alabama in 1915, according to C. E. Lesher, of the United States geological survey, acting in co-operation with the Alabama geological survey, was 14,927,937 short tons, valued at $19,066,043. This represents a decrease of 665,485 tons, or 4 per cent, in quantity, and $1,783,876, or 8 per cent, in value, compared with 1914.

The quantity of coke produced in Alabama in 1915 was 3,071,811 short tons, a decrease of 12,338 tons, compared with 1914. The output of beehive coke amounted to 1,001,477 tons, a decrease compared with 1914, but the quantity of coke produced in by-product ovens increased from 2,031,535 tons in 1914 to 2,070,334 tons in 1915. To produce this coke 4,695,938 tons of coal was used—1,708,228 tons in beehive ovens, and 2,987,710 tons in by-product ovens.

More than 96 per cent of the coke made in Alabama is consumed within the state. According to reports to the United States geological survey, however, small quantities of coke were shipped to 14 other states in 1915, some going even as far west as the Pacific coast, and a small quantity was also exported.

## Small Arms Factory

Toronto, July 18.—The Canadian government has decided to build and operate a small arms ammunition factory at Lindsay, Ont., where a site of 100 acres has already been purchased for the purpose. The contract for the work has been let to the Westinghouse, Church, Kerr & Co., engineers, and contractors of New York which will employ upwards of 400 men on the building and installation of machinery. The construction will be of concrete, steel and glass. The plant will give employment to 2,000.

Louis Hoster, active president of the Bessemer Foundry & Machine Co., Bessemer, Ala., celebrated on July 14 his half century of continuous activity in the foundry business. Twenty years ago, he established his present plant in Bessemer, and during this entire period his foundry has not been closed one day, except on legal holidays. Steady work has been a watchword with him through all kinds of periods.

# Heavy Loads

*Are Being Carried by Ore Boats—Some Wild Tonnage Placed*

Cleveland, July 18.—Reports from the iron ranges as to labor conditions are favorable, although some of the underground mines are still idle. Shipments are going forward satisfactorily and boats are being loaded much more heavily than usual on account of the high stage of water. There is a good demand for vessel capacity in the Lake Superior grain trade and 5 cents is being paid to Buffalo. Some wild tonnage is being placed for ore at $1 free from the head of Lake Superior and the vessel tonnage available is not equal to the demand. Vessels have lost some time during the past few days on account of fog. Shippers to Lake Michigan ports who are in the market for tonnage are not able to do much business even at higher than contract rates.

## Appeal to President

Chicago, July 17.—Agreeing with President Wilson's sentiment in a recent address at Detroit before the salesmen's congress that American businessmen should accept greater responsibilities, the Illinois Manufacturers' Association has asked the President to appoint a committee of 12 to 20 representative business men to visit foreign capitals and confer with commercial organizations all over the world.

The request was made in a telegram signed by President S. M. Hastings, of the association, and suggesting that visits be made at once to Mexico, China and Japan to clear up present business misunderstandings.

## Plans for Viaduct

Wilbur J. Watson & Co., 1150 Leader-News building, Cleveland, is preparing plans under the directions of the chambers of commerce of Oakland and San Francisco for a viaduct over San Francisco bay. The proposed structure will be over three miles long, having a double deck and two miles of subway approaches. The completed plans will be submitted for approval to a board consisting of three officers of the United States war department. The plans call for an expenditure of approximately $25,000,000.

Fritz Wolff, founder of the first large iron works in Portland, Ore., and builder of several torpedo boats and destroyers, died July 15, at his home in Portland, aged 73.

# Steel Awards

*Made in June Were the Smallest in Many Months*

New York, July 18.—Structural steel awards in June, as was anticipated, were the smallest in many months, or since February, 1915, and totaled practically 100,000 tons or 58 per cent of fabricating shop capacity according to the monthly compilation of the Bridge Builders' and Structural Society. The June tonnage compares with 137,000 in May; 125,000 in April; 175,500 in March; 129,000 in February; and 119,000 in January.

The monthly statistics of the Bridge Builders' and Structural Society, showing the percentage of capacity contracted for and the approximate tonnage reported, are as follows:

| Month. | Per cent. | Approx. tonnage. |
|---|---|---|
| June, 1916 | 58 | 100,000 |
| May | 80 | 137,000 |
| April | 72½ | 125,000 |
| March | 102 | 175,500 |
| February | 75 | 129,000 |
| January | 69 | 119,000 |
| December, 1915 | 121 | 208,000 |
| November | 105 | 180,000 |
| October | 78 | 135,000 |
| September | 67 | 115,000 |
| August | 85 | 146,000 |
| July | 86 | 148,000 |
| June | 80 | 138,000 |
| May | 61 | 105,000 |
| April | 62½ | 107,500 |
| March | 64 | 110,000 |
| February | 30 | 51,000 |
| January | 25 | 43,000 |
| December, 1914 | 35 | 60,000 |
| November | 20 | 35,000 |
| October | 35 | 60,000 |
| September | 38½ | 65,000 |
| August | 27½ | 48,000 |
| July | 68 | 125,000 |
| June | 56½ | 95,000 |
| May | 57 | 97,000 |
| April | 88 | 151,000 |
| March | 76 | 130,000 |

Considerable estimating on New York is going on in this district, but when the present prices are quoted, the buyer usually is frightened off, and fails to go ahead. Current lettings are light. Considerable export inquiry for fabricated and plain material is reported. Shape prices are unchanged at 2.50c to 2.75c, Pittsburgh, or 2.669c to 2.919c, New York.

# Quiet on Mesabi

*In Spite of Efforts of I. W. W. Agitators to Cause Trouble*

Duluth, July 17.—The situation on the Mesabi range is fast assuming normal conditions. Many of the strikers are returning to work and others have left the field to go to districts where the I. W. W. agitators are not operating. Several of the underground mines have resumed operations and others will fall in line soon. It is reported that a few of the mines will not be operated again this season, owing to the fact that their ore will not be required, a sufficient supply being on hand at the stock piles. Additional ore, if required, may be easily secured from the pit properties, which are being worked to capacity.

Although the I. W. W. leaders are still making spasmodic efforts to keep miners away from their work, it is felt that no more serious trouble will be experienced. The I. W. W. people have issued circulars in Duluth, stating that over 20,000 men have left the mines and pits, but it is claimed on good authority that less than a quarter of this number are out. The pit men, railroad men and dock workers are refusing to have anything to do with the agitators and this, it is believed, will prevent them from gaining further headway in creating trouble.

# The Non-Ferrous Metals

**Copper** **Lead** **Spelter** **Tin**

A HALT was called to declining spelter prices during the past week when galvanizers, attracted by the lower quotations, again entered the market. Within the past few days, a good-sized volume of business has been transacted, principally for third quarter, and prices once more have shown a tendency upward.

In normal times, galvanizers are the biggest buyers of the metal, taking more than 50 per cent of the spelter consumed in the United States, but for more than a year these interests have taken a comparatively small amount. At present, the production of galvanized goods is estimated at about 30 per cent of what it was before the outbreak of hostilities in Europe. Just how long the present buying is going to continue, is uncertain, but a large seller recently was quoted as saying that if prices again went above 10c, the demand for galvanizers would disappear.

As the result of the upward turn in prices, there is a growing volume of inquiry from abroad for prime western and it is thought that a fair proportion of this business will be placed shortly. The demand for the better grades, however, fails to improve and prices, consequently, are not showing a pronounced tendency to follow the advances on prime western. In fact, the top of the spelter market on all grades may be safely placed at 20c, but it is more likely that tonnages of high grade spelter might be secured nearer 15c.

Regarding spelter prices, an interesting comment was made recently by J. L. Bruce, general manager of the Butte & Superior and Hudson Bay Zinc Mines companies.

"There may be a rally, but I don't think it will carry the price back above 10c and 20-cent spelter we will never see again," said Mr. Bruce. "What effect this will have on production is problematical, but in the nature of things it is to be expected that it will result in the curtailment of output."

## New York Market

NEW YORK, July 18.—Demand for metals, which has been exceedingly dull for the past month or two, showed a marked improvement during the week ending today. The chief feature was the development of a small buying movement in spelter. For the first time in several weeks, galvanizers are entering the market for their requirements of this metal and are buying fair tonnages for delivery through the second half, but principally the third quarter. There also is an improved inquiry from abroad. As a result, prices have advanced and most producers have adopted a very firm attitude. A disappointing feature is the lack of demand from the brass mills. Prime western now is quoted as follows: Prompt, 9c to 9.25c, St. Louis; July, 9c to 9.12½c; August, 8.75c to 9c; September, 8.62½c to 8.75c; last quarter, 8.37½c to 8.62½c. Brass special spelter for prompt shipment is quoted at 10c to 10.50c, St. Louis.

In the lead market, a large tonnage has been taken from several Canadian concerns which recently have booked new shrapnel contracts. Aside from this, demand has been only of moderate proportions from domestic consumers, and there has been very little from abroad. Prices again are lower and the outside market now is quoted at 6.10c to 6.15c, St. Louis, and 6.20c to 6.30c, New York for July shipment. August shipment is quoted at 6.05c to 6.15c, St. Louis, and 6.15c to 6.25c, New York. The American Smelting & Refining Co. continues to quote 6.50c, New York, and 6.42½c, St. Louis.

The outside copper market continues to fall off, by reason of the quantity of material available, which is greater than the market can absorb. Electrolytic now is quoted as follows: Prompt and July 24.50c to 25c, cash; August and September 23.50c to 24c, cash; last quarter 22.50c to 23c, cash. Prompt lake copper is quoted at 25.25c to 25.75c, cash, and ordinary casting copper at 23c to 23.25c, cash. Producers' prices continue nominal at 28.50c to 29c, delivered 30 days, for last quarter shipment.

The antimony market was featured during the week by the booking of 400 to 500 tons of antimony for early shipment to concerns in Canada which have taken new shrapnel contracts. In addition there was a fair amount of domestic business in small lots. The demand, however, is not sufficient to strengthen the market, and there is practically no demand at all for futures. Spot antimony now is quoted at 14c to 14.50c, New York.

The outside aluminum market reflects a sagging tendency, due to somewhat increased supplies and lack of demand. No. 1 virgin for prompt shipment in carload lots is quoted at 57c to 59c; No. 1 remelted at 56c to 58c, and No. 12 alloy at 46c to 47c.

The tin market continues to sag off by reason of the consistently poor demand. Spot Straits is quoted at approximately 37.75c, New York, July at 37.50c, August at 37.50c, September at 37.25c, etc.

(*For complete prices see page* 148.)

# Welding Tubing by Oxy-Acetylene

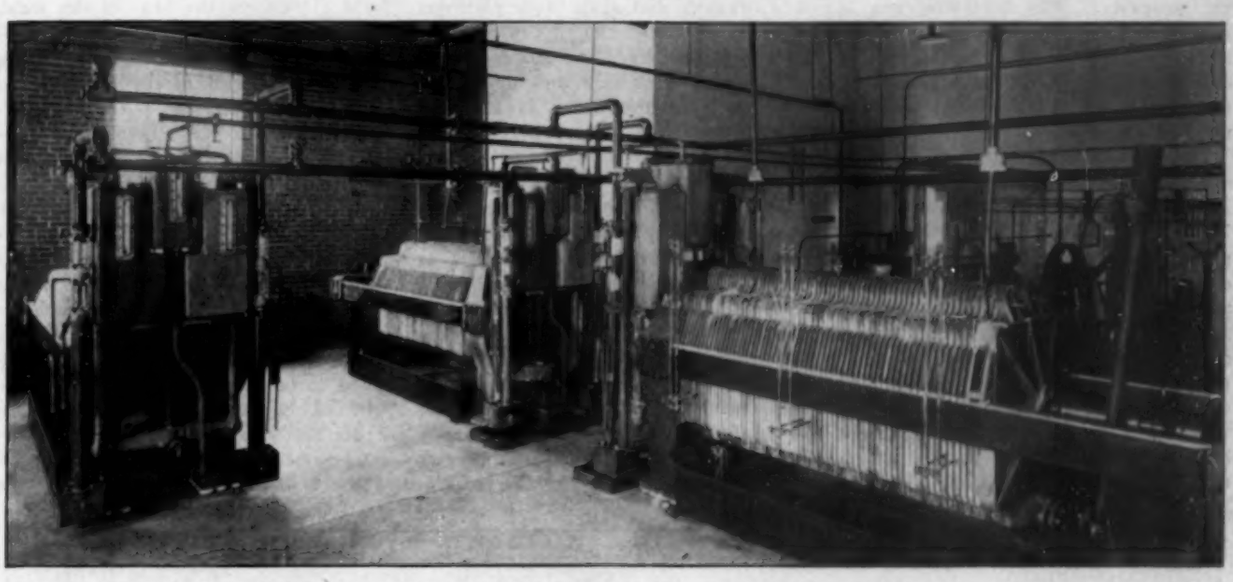
*THE MANUFACTURE of light gage steel tubing is being accomplished by the Elyria Iron & Steel Co. through the use of the oxy-acetylene torch—The process differs from that usually employed—This article describes the company's new plant and explains the various steps necessary to make the tubing*

A NEW method for the manufacture of light gage steel tubing has been perfected by the Elyria Iron & Steel Co., at its new plant, 232 East 131st street, Cleveland. A patented oxy-acetylene process is employed which is said to be proving highly satisfactory.

This deviation from the former scheme of manufacture originated in the development of an automatic welding machine invented by Marshall Burns Lloyd, vice president of the Automatic Welding Co. The machine, which was first made by this company at its Menominee, Mich., plant, takes strip steel, forms it into cylindrical butted tubing, welds it, grinds off the burr, polishes the surface, cuts the tube in required lengths and stacks them in stock piles, in an automatic continuous operation. When the development of the machine had reached a practical stage, the Elyria Iron & Steel Co. bought the equipment and United States patent and manufacturing rights, the Automatic Welding Co. retaining Canadian and foreign patents.

At the time of this purchase the Elyria Iron & Steel Co. was manufacturing structural tubing and railroad track material at its Elyria, O., plant. The buildings and facilities there did not seem adaptable to the process of making light gage tubing, consequently the new factory in Cleveland was built, and the general offices of the company moved from Elyria.

The departments of the Cleveland plant have four distinct functions—that of generating oxygen, of making acetylene, of welding the tubing, and of shaping it into commercial forms. These operations take place in one large and four small buildings. The oxygen plant is installed in a 42 x 66-foot brick structure, about 125 feet from the main factory. Water previously filtered in a Griscom-Russell Co. filter is decomposed in four bipolar electrolytic oxygen and hydrogen generators furnished by the International Oxygen Co., 115 Broadway, New York. Each generator has a capacity of 4,000 cubic feet of oxygen and 8,000 cubic feet of hydrogen per 24 hours. The generators were the first of their kind to be installed, although at the present time similar machines are being installed in various parts of the country. Each generator requires a floor space of 5 x 5 feet and is 8 feet high. Each is composed of 60 plates each 36 inches square, requiring 320 amperes at 120 volts. This current is furnished by two General Electric 100-kilowatt direct-current generator sets, the wiring being arranged for operating the gas generators singly, or in two series of two each. The aggregate capacity of the generator plant is 14,400 cubic feet of oxygen and 28,800 cubic feet of hydrogen per 24 hours. The gas is conducted to two gas-holders, each of 15,000 cubic feet capacity, where it is kept under a pressure of 3 inches of water. The oxygen is metered by an American Metal Co. meter installed in the generator plant. The gas-holders are 43 feet in diameter and 26 feet high. They were built by the Cruse-Kemper Co., Ambler, Pa.



THREE OF THE FOUR BIPOLAR ELECTROLYTIC OXYGEN AND HYDROGEN GENERATORS. EACH MACHINE HAS A CAPACITY OF 4,000 CUBIC FEET OF OXYGEN PER DAY

Oxygen for the factory is pumped from the gas-holder to two storage tanks near the generator building by a two-stage compressor made by the Hall Steam Pump Co., Pittsburgh. The tanks have a capacity of 5,000 cubic feet, each at 300 pounds pressure. The pump is automatically controled by electricity to maintain a pressure varying from 275 to 300 pounds. The storage tanks were furnished by the John Wood Mfg. Co., Conshohocken, Pa.

The oxygen is conducted from the storage tanks to the factory through a 2-inch underground line after the

pressure has been reduced to 50 pounds per square inch. Hydrogen is not used at the factory and is therefore a by-product of the oxygen process. Hydrogen, and oxygen above the requirements of the factory, are sold to outside consumers. The charging lines accommodate six cylinders of oxygen and six cylinders of hydrogen at one time. The pressure for charging is maintained by a Platt Iron Works three-stage compressor for the oxygen and a Norwalk Iron Works compressor for the hydrogen. Each of these machines has a capacity of approximately 12 cubic feet per minute up to 2,000 pounds pressure.

Carbide for the manufacture of acetylene is stored in a 25 x 25-foot building at the extreme west end of the property. The acetylene gas is generated in a 20 x 34-foot, two-story brick building, about 20 feet from the carbide storage. Acetylene passes to the welding machines through a 2-inch underground line.

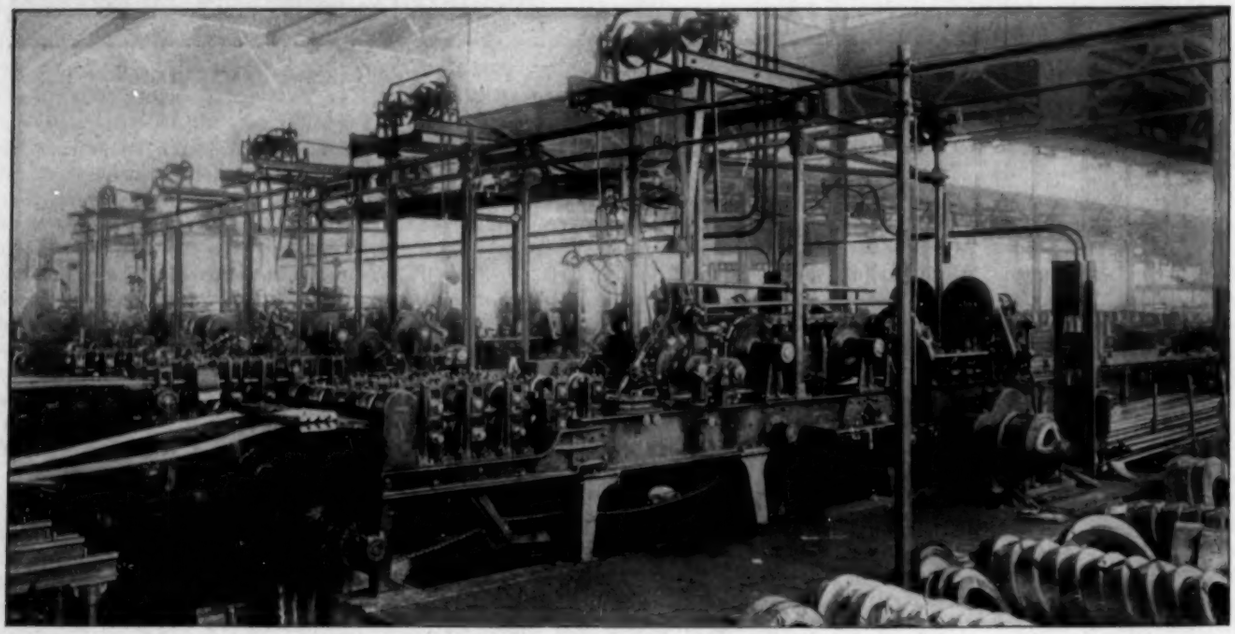
The main factory building is a steel and brick structure, 542 feet long and 110 feet wide. It is divided into three longitudinal bays, the center being surmounted by a monitor. The west end, which houses the strip steel storage and welding machines is constructed with the roof trusses at right angles to those in the main part of the building. This will allow the construction of a wing to the north, which will eventually tie the present building with a similar parallel structure, when the need for it arises. Heat for the entire factory is furnished by two Ideal boilers set in a 35 x 62-foot building, which also contains a blacksmith shop equipped for repair work and case-hardening. Steam is conducted to radiators in the main factory and office building through an 8-inch main and distributing system with a 3-inch return line.

The strip steel used in the manufacture of tubing comes in rolls of about 2 feet in diameter. Cold rolled stock is generally used, although hot rolled is carried in stock for occasional orders requiring it. The steel is from 16 to 20 gage and in widths to make up from ½ to 4-inch tubing. It is received from the railroad siding at the south of the building and is handled by means of a 3-ton Brownhoist traveling crane of 60-foot span. A Fairbanks dial scale with platform built flush with the floor provides weighing facilities. The storage room is about 71 x 85 feet and under the same roof at the north is a room, 32 x 71 feet, used for garage purposes.

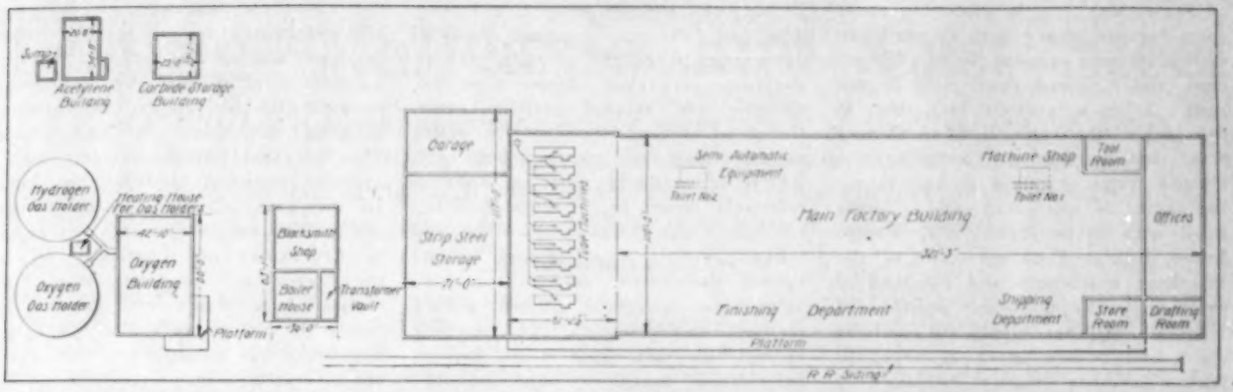
### *The Welding of the Tubing*

The strip steel is carried by the overhead crane to a Toledo Electric Welder Co. machine, which welds seven or eight rolls into one continuous roll. A 3-ton Pawling & Harnischfeger electric crane on a runway traversing the building distributes the large rolls to the nine welding machines, which are arranged parallel to each other in one row.

Each machine is composed of two complete independent units for making tubes. The strip steel is unrolled into a series of six sets of forming rolls, the first four of which give the strip a cross sectional appearance similar to a double wave. The fifth and sixth rolls bend the outside waves over a mandrel forming the strip into a cylinder with the edges butt to butt and about 1/32-inch apart. Immediately behind the sixth roll is a welding vise composed of two endless linked chains to which are screwed steel blocks to fit the tube. The vise holds the tube rigidly as it passes under a fixed torch, which receives oxygen and acetylene through ⅜-inch lines from supply pipes overhead. The endless chain vise revolves about water-cooled chambers and in turn cools the tubing. A spray of water is played upon the welded tube just behind the torch, further reducing the heat of the weld. A Norton grinding wheel then removes the burr from the welded seam and a sizing roll forces the tube to exact shape and size. Another continuous chain arrangement holds blocks which grip the tubing and pull it through the forming rolls and under the torch at a uniform speed. The straightening of the tubing is accomplished by means of three sets of rolls set in different angles about the tube. Several of the machines are equipped with a polishing device which gives the tubing a highly polished surface that can be nickel-plated without further buffing or polishing. From the straightening rolls the tubing passes to an automatic cut-off which is tripped when the end of the



AN AUTOMATIC TUBE WELDING MACHINE SHOWING THE STRIP STEEL ENTERING THE FORMING ROLLS AT THE LEFT. THE TORCHES AND ONE OF THE WELDING VISES ARE SHOWN IN THE CENTER OF THE PICTURE. THE CUTTING-OFF MECHANISM IS SHOWN AT THE LEFT. OXYGEN AND ACETYLENE SUPPLY PIPES ABOVE THE MACHINES ARE SHOWN




PLAN OF CLEVELAND PLANT OF ELYRIA IRON & STEEL CO., SHOWING ARRANGEMENTS OF BUILDINGS AND DEPARTMENTS

tube strikes an adjustable stop. The tubing passes through a trough on its way to the stop and after the cutting blade has severed the tube, the trough automatically opens at the bottom, allowing the piece to drop to a truck.

During these operations the tube has been passing through the machine at a speed of from 3 to 10 feet per minute, depending upon the gage. The machines are individually driven by 440-volt 5 and 10-horsepower alternating-current motors made by the General Electric Co. The 18 units of the nine machines have an aggregate capacity of 75,000 feet per day and the finished tube is claimed to be within 0.004-inch of the rated diameter and within 1/32-inch of the stated length.

In addition to the nine automatic welding machines, the company has a battery of six rolling machines and 12 welding machines which constitutes the semi-automatic department. This equipment occupies a space in the north bay in the central part of the main building. These machines employ the same principle as is used in the automatics, the difference in operation being that the forming process is carried out on a machine entirely independent and apart from the welding machinery. This arrangement facilitates the handling of job work, which, because of the limited amount of the orders, does not warrant the setting up of the large automatics, which are better adapted to continuous stock work.

*The Finishing Department*

The finishing department takes up the middle and south bays of the building. Williams, White & Co. bulldozers, Ferracute and Consolidated presses and numerous machines of Elyria Iron & Steel design, are used for fabricating the tubing into commercial shapes. The product is made up into a vast number of articles, among which are exhaust tubes, steering gear parts, and tail pipes for automobiles; foot and head pieces for beds; cylinders for bicycle pumps, and parts for vacuum cleaners, aeroplanes, washing machines, metal furniture, telephones, etc.

The east end of the north bay contains a well-appointed machine shop and tool room completely equipped to repair and manufacture the automatic and semi-automatic welding machines. The machine tools have been arranged with a view to efficiency and safety. A blower system is provided to carry away dust from the grinding wheels. Windows 12 feet in height in the side walls and 7-foot windows in the monitor supply ample light in daytime. Artificial lighting is furnished by overhead incandescent lights suspended from the ceiling and by individual lights for various machines.

The shipping department and store room are situated at the southeast corner of the building adjacent to the railroad siding. Two Fairbanks dial scales are conveniently placed for the weighing of the material as it passes out to the shipping platform. The factory office is located in the center of the building. Two elevated floors suspended from the roof trusses of the north bay contain toilet rooms, which are connected with the main floor by open stairways. The floor of the factory building is made of creosoted wood blocks furnished by the Ohio Wood Preserving Co., Pittsburgh, Pa. The entire plant is fireproof in construction, the use of inflammable wood being restricted to the interior finish of the office. Ernest McGeorge, engineer, Cleveland, designed the plant.

The two-story structure forming the front of the factory building is constructed of selected common brick with stone trimmings. The first floor is devoted to offices of the accounting, purchasing and operating departments; the second floor contains the executive offices.

The plant has been in operation since September 15, 1915. At the present time about 300 men are employed, but the output has never been up to the capacity due to the scarcity of workmen experienced in making tubing by the oxy-acetylene process. Since the company operates the only plant of this kind in this country, it has been found necessary to train inexperienced men and this is being accomplished as rapidly as possible.

The officers of the Elyria Iron & Steel Co. are Hugh B. Wick, president; Myron A. Wick, vice president and treasurer; J. L. Barnard, secretary; Willis McKee, general superintendent, and William T. Bentz, sales manager.

## American Machinery in Argentina

Argentina depends entirely upon the outside world for its machinery and related products and before the war the United States ran a poor third in supplying this market. A report on the subject just published by the bureau of foreign and domestic commerce, department of commerce, calls attention to the opportunity now before American manufacturers to take over permanently an important part of this trade and points out frankly the causes that have made competition with Germany and England difficult in the past. A special point is made of the foresight of foreign concerns which have supplied leading technical and industrial schools with machinery and machine tools free of charge, so that the future engineers and shop officials would naturally favor tools of that manufacture.

Previous to the war Germany furnished 46 per cent of the miscellaneous machinery imported by Argentina, England 21 per cent, and the United States 13 per cent. The Unit-

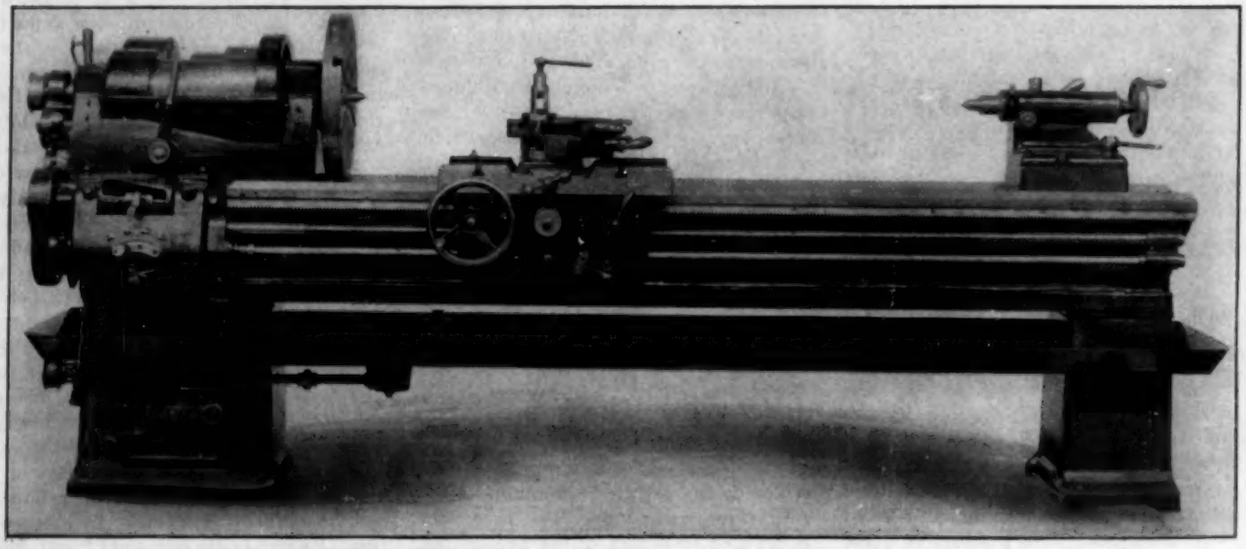
ed States was first in supplying spare parts for machinery with 29 per cent, Germany was second with 25 per cent, and England third with 21 per cent. It is a curious fact that 46 per cent of the agricultural machinery was imported from Australia, the United states standing second in the list with 34 per cent and Canada third with 16 per cent. The United States furnished 63 per cent of the threshing machinery and England 33 per cent. The dominant position of England in the supply of railway plant and rolling stock is very apparent, as that country furnished 75 per cent of the locomotives, 89 per cent of the passenger coaches, and 47 per cent of the freight cars. Of the steel rail business, England held 31 per cent, Germany 29 per cent, and the United States 26 per cent. Of wheels and miscellaneous railway material, England supplied over 70 per cent. The Germans led in miscellaneous electric railway material, and supplied 45 per cent of the dynamos and electric motors, England being second in the latter line with 41 per cent. France furnished 36 per cent of the automobiles, the United States 19 per cent, and Germany 16 per cent. The war brought serious financial depression to Argentina and recovery has been very slow. Imports of machinery and related articles were, therefore, among the first to suffer and the last to recover, but such American products now are sold in relatively larger proportions than before the war. The author of the bureau's report, J. A. Massel, special agent, has some decided opinions upon what constitutes efficient selling methods in Argentina. "It is very evident," he says, "that if one exports agricultural machinery and possibly a few other lines of minor importance, the American manufacturer has thus far had virtually no market in Argentina for his products in general, and for machine tools in particular. The following are the most important reasons for this state of affairs: The very few American houses that tried to do business in Argentina failed to succeed because of, in a great measure, their failure to adapt themselves to the business practice of the country. The American manufacturer was content to send out traveling salesmen with little or no knowledge of the country's language or customs. He endeavored to sell, mainly from catalogs and price lists printed in English. In general he demanded payment for his goods cash against shipping documents in New York. The fact that Europe has immensely superior shipping facilities has been an important factor. Europe, also, has made large investments of capital in Argentina and practically all of the important industries, the railroads, power plants, etc., are in the hands of Europeans. The fact that Argentina has a large and free market in Europe for its products is not without its influence. And, finally, it must be confessed that the Europeans have had the incentive of really needing the market, while many Americans have been only mildly interested."

The report is entitled "Markets for Machinery and Machine Tools in Argentina", Special Agents Series No. 116, and is based on personal observations and on interviews with officials, active managers and engineers of commercial undertakings and establishments. There are detailed descriptions of market conditions.

# Develops Heavy-Duty Engine Lathe

A NEW 18-inch lathe has been recently placed on the market by the Oliver Machinery Co., Grand Rapids, Mich. This tool is designed for fast, heavy cuts, combined with precision of work, and is said to be built with ample power and great rigidity. All parts are jig machined and fitted to templates to insure interchangeability. The lathe is massive, built for heavy duty, with double-back gears, 3-step cone, using a 3¼-inch driving belt. All gears are provided with guards hinged to permit of easy access. The bed is 8 feet long, 13 inches deep and 15 inches wide and is reinforced by boxed sections. The supporting columns are placed to allow no overhang at the end of the bed and are wide, to shorten the span of the bed between columns.

All the parts are of ample size to withstand the strain of heavy cuts. The gear box for quick change gears requires only two levers for the 32 threads, ranging from 3 to 46 cuts per inch. The taper attachment is carried on the back of the bed, giving a maximum taper of 4 inches per foot and will turn 24 inches at one setting. The lubricating equipment is provided with a rotary pump connected directly to the spindle, which insures an ample flow of oil or cutting lubricant.



18-INCH HEAVY-DUTY ENGINE LATHE BUILT BY OLIVER MACHINERY CO.

# Testing Malleable and Cast Steel

*AN ENGLISH viewpoint on the scientific manufacture of small castings, with discussions of chemical, physical and metallographical considerations—The author of this article has studied the practical interpretation of the results obtained from analytical tests of castings to improve the quality of the product*

BY ANDREW HARLEY

BROADLY speaking, the subject in which we are interested is the production of light castings in malleable iron and mild steel. My experience in recent years has been in the production of castings for the motor and cycle trade, and what I have to say naturally applies more particularly to this class of work. Such as it is, the field is a vast one and it is obviously impossible in the time at my disposal to cover the ground even in the most general manner. I therefore propose to mention a few general considerations, to deal with the production of molten metal and to discuss a series of tests which I have made on cast malleable and cast steel. Among foundrymen sharp differences of opinion exist concerning the best methods of production, and among both foundrymen and engineers there is considerable diversity of opinion as to the relative merits of the two metals as applied to various purposes. With regard to the former, these differences of opinion occur at every stage of production. One man puts his faith in certain brands of iron, while another may not worry about the particular brand if the analysis is according to his liking. One man will say that good malleable cannot be made with cupola metal, another will affirm that he is doing it. On the molding floor one man favors the use of chills, another places a feeder wherever he thinks it necessary, and sometimes where it is not. In regard to annealing malleable, no two men think alike. One man will swear by round ovens, another will swear at them. One man believes in soaking; another will ask how it is possible under the present restrictions.

With regard to differences of opinion that exist among foundrymen and engineers as to the relative values of the two metals, the last section of this paper will have a more direct bearing on this question. In the meantime I will refer to a paper recently published in *The Engineer*. The author, an engineer, advocated the employment of malleable iron in preference to cast steel for tractor road wheels. The suitability of the metal was not only emphasized, but a point was made of the greater ease and lower cost of production. My experience would lead me to differ with the writer on both counts. First, I have my doubts as to whether malleable is at all suitable for such a job, and, secondly, I am decidedly of the opinion that in this particular instance a steel casting of high quality could be produced more cheaply than a malleable casting.

The cost, or rather selling price, has a good deal to do with the question of quality. The cult of cheapness can be carried too far. The mal-

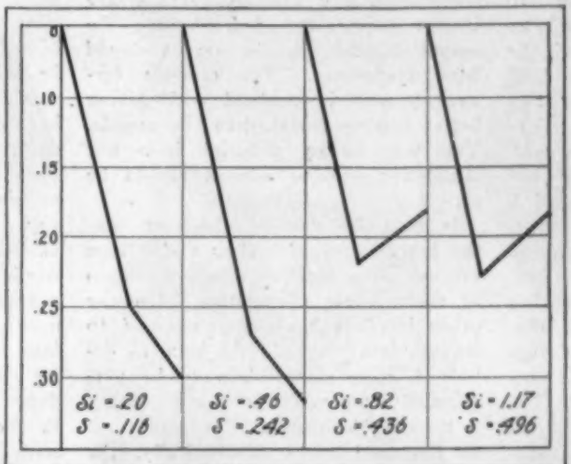



FIG. 1—CHART SHOWING THE SHRINKAGE OF MALLEABLE IRON

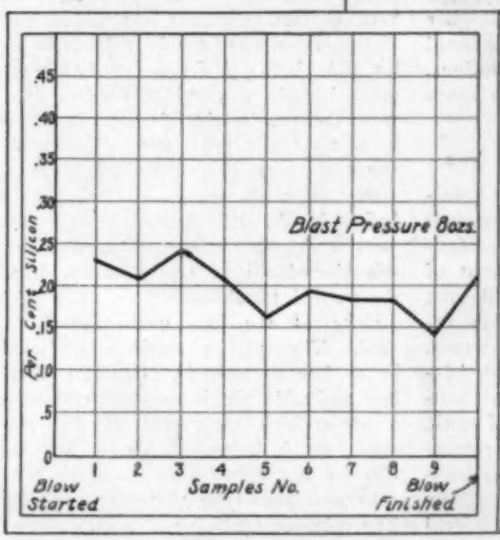



FIG. 2—LOSS OF SILICON, CUPOLA MELTED WHITE IRON

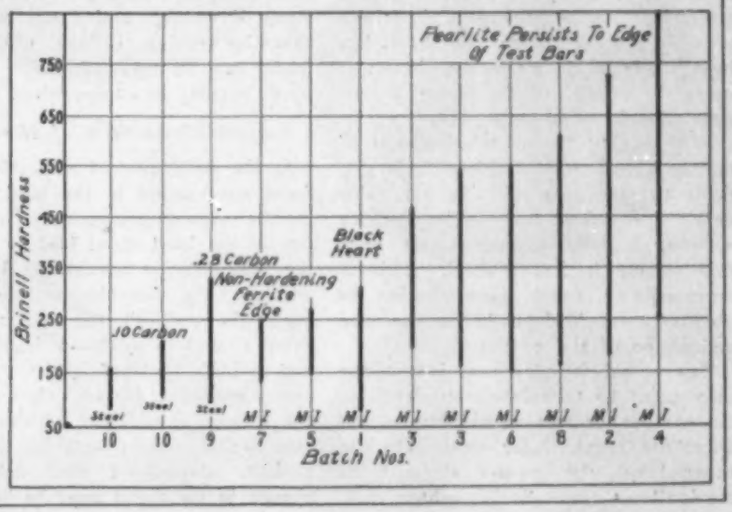



FIG. 3—INCREASE IN HARDNESS PRODUCED BY QUENCHING SPECIMENS FROM 820 DEGREES CENT.

An address delivered before the Birmingham branch of the British Foundrymen's Association, Dec. 4, 1915.

leable trade particularly has suffered from this. The cutting of prices has not always been accompanied by a reduction in cost due to improved methods of production. More often the reduction in cost has been accomplished by the use of inferior material. The buyer is not free from blame, however. With too many, orders are placed at the lowest price, irrespective of quality. They have acted on the principle that "malleable iron is malleable iron all the world over". People sometimes get what they pay for.

*Improved Quality*

We must constantly strive to cheapen production, but we must also strive to improve the quality of the product. The processes involved must be carefully studied, and this can only be done by the use of scientific equipment, handled by men with some scientific training. Much unnecessary waste would be avoided, provided the management is competent to apply the scientific information in a practical manner.

There is another factor influencing foundry costs, and that is the influence of design. In fact, the design not only influences cost, but very often the quality of the casting. The foundryman should be consulted in this matter and in an efficiently managed concern this is done, and any alterations suggested are made where possible. Even when the best has been done with a design, in most cases there will still be plenty to engage the foundryman's skill.

With regard to the relative cost of malleable and steel castings it is difficult to give a definite answer. For very light work, say under ⅛-inch section, it tells against steel; over this section it favors steel. This is necessarily a rough generalization as obviously much depends on the size and shape of the casting.

The actual foundry cost is not the only point to take into consideration. At present greater machining allowances are required for steel. On the other hand, the greater strength of steel allows a relatively lighter casting to be used.

For certain classes of work, such as cycle parts, a fine skin is absolutely essential, as the majority of such parts have not only a very small machining allowance, but subsequently have to be enameled or plated whereby any irregularity on the surface would be intensified. Malleable, therefore, is in favor for such work, but progress is being made with steel in this respect.

Broadly speaking, the particular melting method adopted is governed by the class of work and the output to be handled. Certain prime essentials are necessary in every furnace melting any metal on a commercial scale. All foundrymen are acutely aware of what these essentials are. The metal must be of ample fluidity, correct and regular composition and produced at a reasonable cost.

Dealing with malleable first, the three principal types of furnaces in use are the crucible, reverberatory or air furnace and the cupola. The air furnace is used chiefly in the production of black heart malleable with which we are not much concerned. In the production of Reaumur malleable, the cupola and crucible furnace are almost universally used. Where the output justifies it, the cupola should have preference. The crucible furnace usually is credited with giving better quality metal than the cupola. This may be so, although it is not altogether obvious why it should be so.

It may be due to the fact that the percentages of carbon and silicon are not subject to so much alteration in the process of melting. On the other hand, it has always seemed to me that variations in the iron, as delivered, were more likely to be perpetuated in the molten state when melted in the crucible furnace. The cupola can be operated more economically, the metal can be obtained in a higher state of fluidity, and I am convinced that by taking certain precautions, metal can be obtained which is much more regular in composition.

*Uniform Composition of Hard Iron*

In the production of malleable, a uniform composition in the hard state is of the utmost importance. Irregularities in the hard metal lead to most of the difficulties in annealing. I do not advocate any particular analysis as being right and all the others wrong. What I want to emphasize is, that, having decided on what is the most suitable composition for your class of work, the furnace should give (within reasonable limits) molten metal of that composition throughout the melt. Any change in the metal must be intentional and known so that the castings subsequently can be graded and given the annealing treatment most suitable to their composition.

In the following I will describe as briefly as possible the means which I have found it necessary to adopt to obtain this control. For the sake of brevity I must make certain assumptions. I must assume the existence of a laboratory or facilities for obtaining analyses. I also assume that the furnace is fairly correct in its proportions and that there is uniform supply of air at the correct pressure. In other words I am confining myself altogether to the raw material which goes into the furnace. The pig iron must be bought to specification and should be adequately checked. We have found it advantageous to give each separate consignment a reference number. This number is not only attached to the heap of pig iron in the yard, but is used in all subsequent records. A separate stock card is filled out for each consignment. This card shows the analysis and also the usage.

*Importance of Grading Scrap*

Scrap must be graded according to analysis, the silicon content being sufficient, as a rule. The grading of scrap is rather important, although it might be inferred that if the molten iron is regular in composition, the scrap will be so also. If the scrap is melted daily, however, the composition of the metal will change, due to the fact that a certain portion of the metal is, of necessity, melted over and over again. If one could be sure that the whole of the previous day's "git and runner" metal was obliging enough to make its way into the next day's castings, then everything would be all right. As it is, to keep perfectly straight, small daily adjustments would be necessary in the pig used. To avoid this, the scrap from one mix is accumulated so long as that particular mix is in use. If the silicon has been kept fairly regular, this heap of scrap can be incorporated in the mix at a subsequent date, with the comfortable feeling that you know what you are using. If the silicon content has altered radically through some unforseen cause, this is quickly known by the daily analysis of the cast metal and both castings and scrap, with this altered silicon, are separated from the normal metal.

Coke of the best quality must be used. The sulphur particularly should be as low as possible. Ordinary English malleable pig irons usually contain a pretty high percentage of this element and it is undesirable to increase this by any appreciable amount. The coke also should be uniform physically. The coke we are using at present shows the following average composition: Fixed carbon, 93.65 per cent; ash, 5.65 per cent, and sulphur, 0.70 per cent.

Definite knowledge must be acquired with regard to the inevitable changes that take place in the composition of the metal during the melting process. These changes must be allowed for. The elements affected are carbon, silicon and sulphur. The amounts of these elements present and also the relative proportions, largely determine the annealing treatment required. We have found that these losses and gains vary

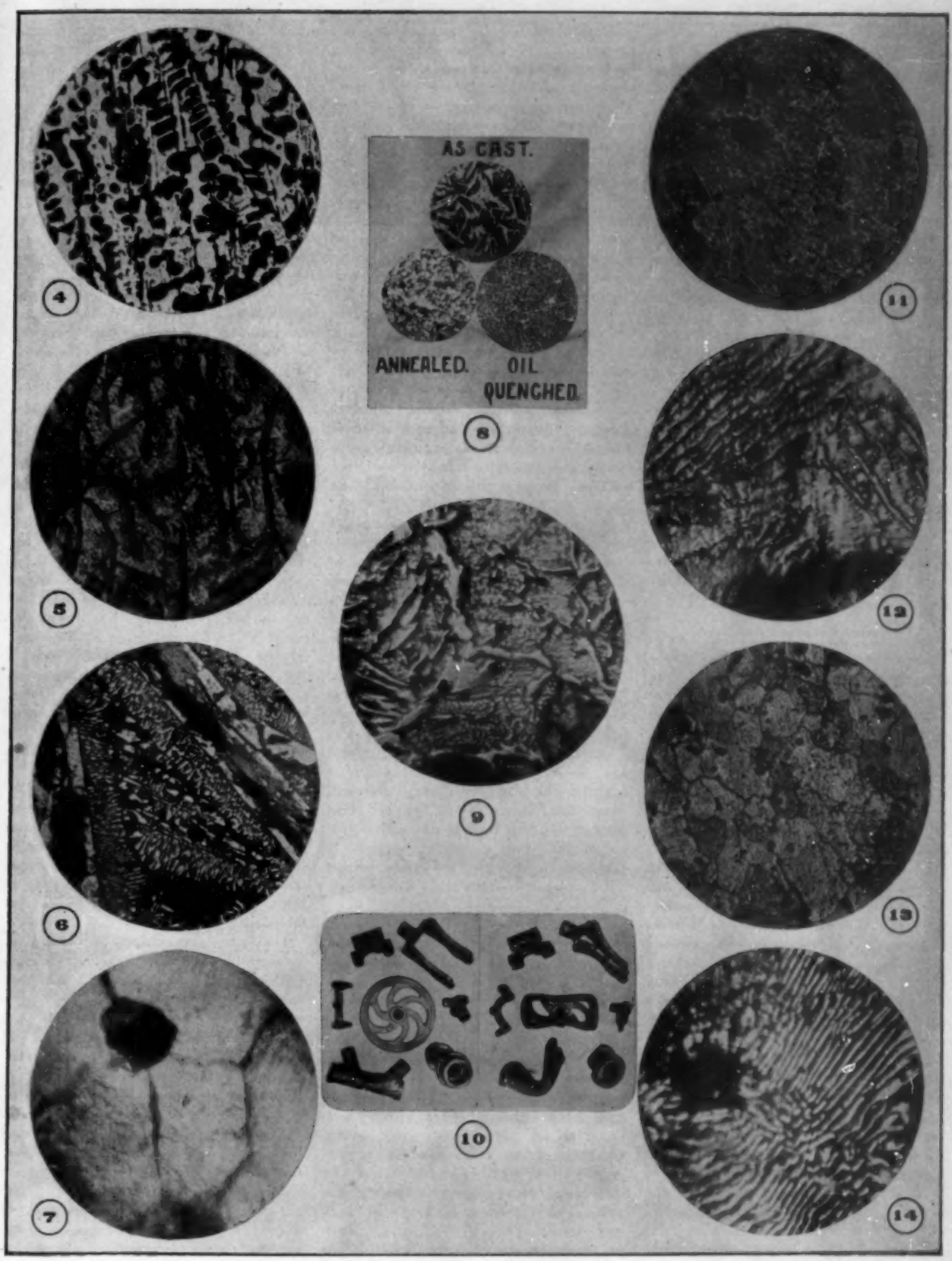



FIG. 4—PHOTOMICROGRAPH OF WHITE PIG IRON; FIG. 5—PHOTOMICROGRAPH OF PIG IRON USED FOR STEEL MAKING; FIG. 6—PHOTOMICROGRAPH OF SPIEGELEISEN; FIG. 7—ENLARGED PHOTOMICROGRAPH OF *C*, FIG. 15; FIG. 8—EFFECT OF HEAT TREATMENT ON MILD STEEL; FIG. 9—ENLARGED PHOTOMICROGRAPH OF *C*, FIG. 18; FIG. 10—STEEL CASTINGS AS MADE AND DISTORTED TO SHOW DUCTILITY; FIG. 11—ENLARGED PHOTOMICROGRAPH OF *B*, FIG. 21; FIG. 12—ENLARGED PHOTOMICROGRAPH OF *C*, FIG. 21; FIG. 13—ENLARGED PHOTOMICROGRAPH OF *A*, FIG. 22; FIG. 14—ENLARGED PHOTOMICROGRAPH OF *C*, FIG. 23

throughout a heat. With silicon for instance, the loss in our practice at the beginning would be 0.23 per cent. This would diminish fairly regularly until 0.14 per cent only was recorded. Then, just at the end, we got a sudden jump back to 0.21 per cent. Sulphur acts in much the same way. At the beginning we had an increase of 0.07 per cent, but toward the end this was reduced to 0.003 per cent.

The importance of good, hot metal of suitable and regular composition cannot be over emphasized. This applies to all metals, but particularly to malleable iron and cast steel, and expenditure to secure this is amply justified. It is the foundation on which a good casting is made possible. Neglect or carelessness in this direction renders all subsequent care and skill useless. Many of the troubles that are usually assigned to the defects in molding and coremaking really originate in defective melting. In casting malleable for instance, sears, cracks, draws and blowholes may be avoided to a considerable extent, but over and above all this, the successful annealing of malleable is only rendered possible by the metal being of suitable and regular composition.

### *Annealing Malleable Castings*

The annealing of malleable requires a good deal of skill and experience, even when the hard metal is everything that it should be. There is no royal road to success in this process. Each man must work out his own salvation. The knowledge we acquire from others no doubt is useful, but the knowledge obtained from hard experience is the best.

The following observations on annealing are not advanced, therefore, as infallible *dicta*. They are, however, the result of practical experience and may be helpful to some who are engaged in this most difficult business. If I tried to sum up my views in one sentence on the metallurgical process of annealing, the sentence would run somewhat as follows: "Any process in which equilibrium is established and maintained between the breakdown of the cementite and the diffusion of the carbon towards the exterior is likely to give satisfactory results."

The precipitation of carbon is governed more by composition than anything else. Take the influence of silicon, for example. With low silicon metal of say 0.3 per cent, precipitation is retarded. With a high silicon metal, on the other hand, precipitation may take place too soon, or in other words, at too low a temperature. Very little carbon would be removed and a kind of black heart would be produced.

As Hatfield has pointed out, there are two phases of this annealing process: first, elimination of carbon; second, softening of the interior by precipitation of the annealing carbon. Each phase must be accomplished at the proper time by establishing equilibrium. The treatment necessary to obtain this equilibrium will vary with the composition. The most favorable period for the removal of carbon is the one just preceding actual precipitation. Where the composition of the iron is such that precipitation may take place at a low temperature, equilibrium must be established between the removal of the carbon and the return of the annealing carbon into solution.

The influence of silicon and sulphur should be considered together inasmuch as silicon favors the precipitation of carbon and sulphur retards it. It follows that the primary effect of either is modified by the relative amounts present. In fact, the influence of these constituents must be so regulated as to obtain the balance already mentioned between the rate of diffusion and the breakdown of the cementite. To illustrate this point, a low silicon metal of say 0.3 per cent which is quite annealable with 0.25 per cent of sulphur, is almost un-annealable with 0.5 per cent of sulphur. On the other hand, a higher silicon of say 0.75 per cent will give very indifferent results with low sulphur, the best results being obtained when associated with 0.45 per cent. These statements may not hold good where manganese is present to any extent.

In most Reaumur metal the percentage of manganese is very low, as it ought to be. In black heart you will often find from 0.4 to 0.5 per cent present. In the absence of sulphur this no doubt serves a useful purpose in retarding precipitation to some extent and enabling some carbon to be removed.

Many questions are always asked regarding the practical details in annealing. Sometimes these questions are not answered. I would say this, however, that all such practical details center in the problem I have been dealing with. The design of the oven naturally should give as even a distribution of heat as possible. There is no oven built in which the heat is quite evenly distributed, and I have often been thankful for this. With large ovens, there is generally a considerable variety of work, with varying sections. By exercising discretion in arranging the castings in the oven, a variety of work can be satisfactorily dealt with. Variations in the ore strength also are made to overcome this difficulty. Where there is a battery of smaller sized ovens, the castings can be more closely graded according to weight. A further advantage is that with such a battery, extensive delays are avoided. Ovens are at all stages of firing and unloading and an even flow in deliveries is secured. There are many advantages about such an arrangement, but one disadvantage is the somewhat higher cost of annealing.

If removal of carbon is too rapid, owing to excessive temperature and too strong ore, then the complaint known as *peeling* occurs. If the temperature is too low, or the ore too weak, then hardness results. With a medium silicon iron in a coal-fired oven, the time necessary for diffusion is usually obtained by damping down for the night or *soaking* as it is called, but similar treatment in a large gas-fired oven of say 10 tons capacity might not be satisfactory owing to the longer time such an oven holds its heat. In fact, removal of carbon may be taking place all through the night. In such a case the shutting down of the oven for 24 hours or so in the middle of the fire would prove advantageous. If a high silicon iron is used, the operation may be affected with a total fire after coming up to heat of 3½ days, even for the thickest section. In this period 1½ days would be spent in soaking or diffusing. The carbon removed is, of course, not very large, but for many purposes the malleable is quite satisfactory. If a better quality of iron is desired, the addition of two days to the firing time will produce the extra elimination of carbon which is necessary to give the superior quality to the material.

### *Advantages of Soaking*

With reference to soaking, theoretically a continuous fire is no doubt quite possible, but practically we consider soaking advantageous. If the elimination of carbon is proceeding too vigorously, it allows equilibrium to be established.

The size and shape of the pans, strength of ore used, the temperature and time taken, all have to be adjusted to the one end, but it must be borne in mind that many such details are constantly changed, and necessarily so, according to the size, shape and composition of the castings.

If it is of any interest, I may mention that we use gas-fired round ovens. We make our own pans, and a useful thing to remember here is that a pan should be made of metal which resists annealing. In regard to ore, we use all strengths ranging from all black to 3 to 1. The analysis of good annealing ore should be approximately as follows: Ferric oxide, 84 to 90 per cent and silica, 8 to 13 per cent. Lime should be absent. Ferrous oxide should not be present, and anything more than 1 per cent should cause rejection. In the production of molten steel of

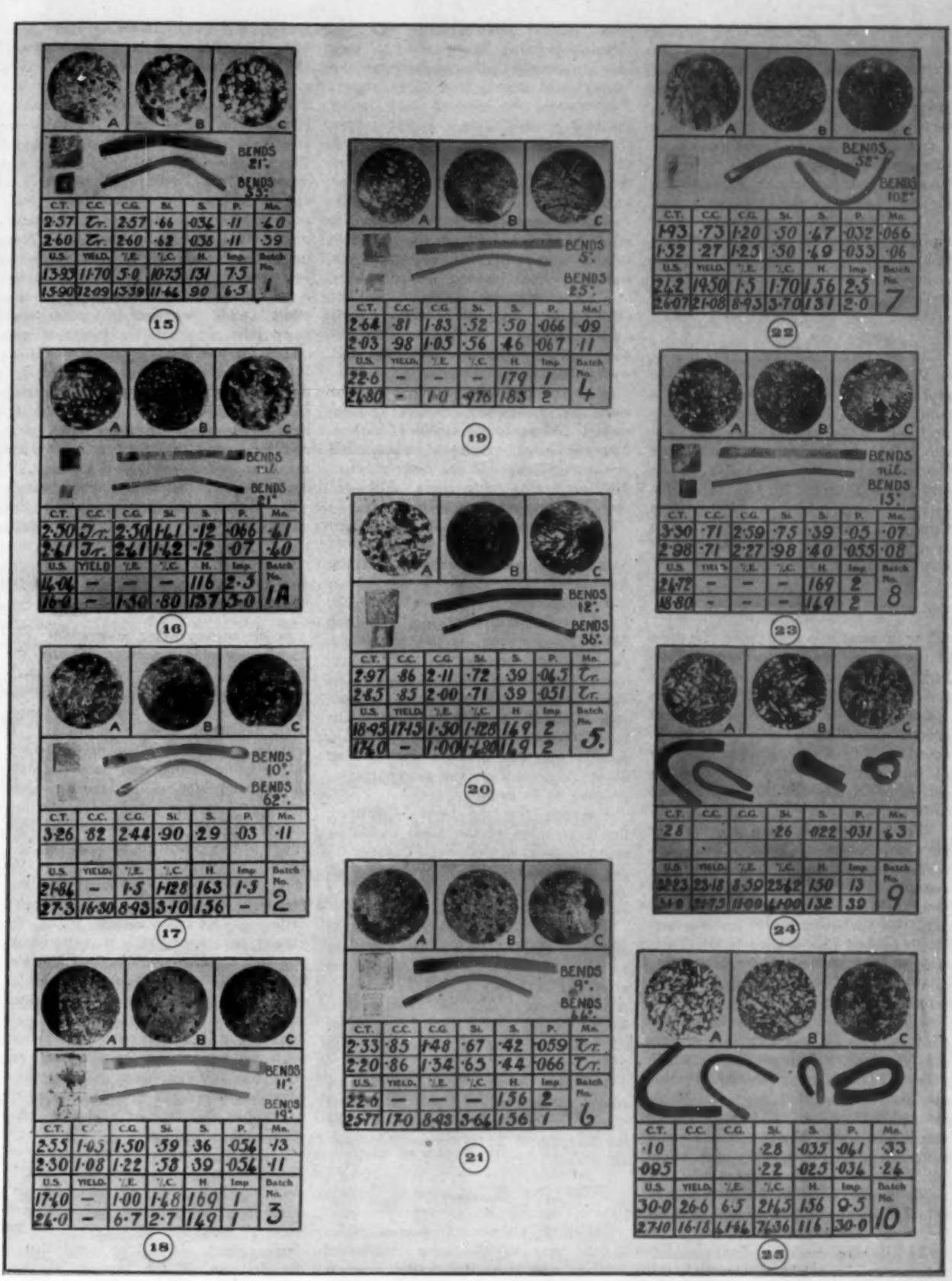



FIG. 15—SAMPLE OF ENGLISH BLACK HEART MALLEABLE; FIG. 16—ANOTHER SAMPLE OF ENGLISH BLACK HEART MALLEABLE; FIG. 17—SAMPLE OF NEUTRAL, BLACK HEART MALLEABLE; FIG. 18—SAMPLE OF REAUMUR MALLEABLE; FIG. 19—ANOTHER SAMPLE OF ENGLISH REAUMUR MALLEABLE; FIG. 20—SAMPLE OF HIGH SILICON REAUMUR MALLEABLE; FIGS. 21-23—SAMPLES OF ENGLISH REAUMUR MALLEABLE; FIG. 24—SAMPLE OF MILD CONVERTER STEEL; FIG. 25—SAMPLE OF MILD ELECTRIC STEEL

low carbon content, we are up against a much stiffer proposition than in the melting of either malleable iron or cast iron. It is only in comparatively recent years that anything like success has been achieved. In making this statement I am referring to mild steel capable of being run into light castings, many of them intricate in design. Furthermore, the molds are only skin-dried, as a rule.

It is interesting to compare the melting temperatures of gray and malleable iron and steel. Ordinary gray cast iron melts at about 1,150 degrees Cent.; malleable iron at approximately 1,250 degrees Cent. and mild steel, about 1,570 degrees Cent.

The pouring temperature, of course, is a different matter entirely. In the process I am about to describe where a bulk of about 1,200 pounds of molten steel has to be cast in one heat and into a large number of small molds, the temperature of the metal has to be very much higher. In fact this must be in the neighborhood of 1,900 degrees Cent. In other words, we require a margin which must be higher by at least 300 degrees Cent.

### *Steel Melting Furnaces*

The general types of steel furnaces in use are the crucible, converter, open-hearth and electric. Each of these four divisions represents wide systems in which there are many varieties. The process of melting which I am about to describe involves the use of a converter of the stock type. The bessemer converter, of course, is the father of all such types.

The chief modifications are that the pig iron, instead of being melted in a cupola is melted in the converter. Also, instead of being blown from the bottom as in the bessemer converter, the metal is surface-blown. The surface-blown method also is used in the Tropenas furnace, but in this case the pig iron is melted in a cupola, as in the bessemer process.

Small capacity converters have been tried many times, but with varying success, the great difficulty being to obtain a metal of sufficient fluidity to cast the general run of light work in an automobile foundry. A larger capacity vessel would no doubt give somewhat hotter metal at the moment of pouring, but a proportionately larger number of molds would have to be poured and before the finish a larger proportion of the metal could not be cast satisfactorily. Where castings of a considerable variety in weight are handled, this trouble would be obviated to some extent by grading the work on the floor.

The melting of the charge in the vessel by means of an oil burner is an important factor in obtaining very hot steel. Before this operation is completed the lining has attained a very high temperature, thus conserving the heat created during the blow proper. Furthermore, the escaping heat during the melt is used to heat a regenerative chamber. The air is passed through this chamber when blowing and enters the vessel at a temperature of 300 degrees Cent.

What I have said about care in the selection of raw material for malleable melting applies equally to steel. In fact, more so, because I doubt very much whether it is possible to perform this job properly without knowing the exact composition of the pig iron and also making a carbon test for each melt. That is the minimum.

A typical analysis of pig iron to be used for conversion, follows: Total carbon, 3.88 per cent; combined carbon, 0.20 per cent; graphitic carbon, 3.68 per cent; silicon, 2.53 per cent; sulphur, 0.04 per cent; phosphorus, 0.04 per cent, and manganese, 1.10 per cent.

Consistently good results have been obtained from pig iron of this composition, the steel pouring hot to the finish. Slight variations in the silicon and manganese content are allowable. Furthermore, silicon should not drop below 2.3 per cent, or manganese 0.8 per cent if the molten steel is required to run very thin castings. The charge takes about two hours to melt and about 20 minutes to blow. The blast pressure for melting is about 1¼ pounds, and the pressure for blowing about 2½ pounds at first, afterwards increasing to 3 pounds.

Assuming that the blow is finished, the composition of the metal should be approximately as follows: Carbon, 0.1 per cent; silicon, trace; manganese, *nil*, and sulphur and phosphorus, 0.04 per cent.

The metal now has to be carburized and deoxidized. This is done by the addition of the mix. The composition after the additions should be approximately: carbon, 0.23 per cent; silicon, 0.2 to 0.3 per cent; manganese, 0.4 to 0.5 per cent; sulphur and phosphorus, 0.04 per cent.

The mix is made up from spiegel, silicon-spiegel and pig iron, the quantity of each needed being calculated to bring the composition up to the second analysis given.

### *Summary*

Taking it all around, the difficulties in the way of producing mild steel castings are great, but much progress has been made in recent years. The manufacture of malleable is a much older business, but the progress made is not what it should be. Malleable iron has possibilities, but the trade suffers from a spirit of conservatism and secrecy. Looking through the various batches of malleable received, I have come to the conclusion that there is a tendency among modern malleable founders to use a higher silicon iron than was used in the earlier days. This may be due to the difficulty of obtaining irons with low sulphur. I do not think, however, that the ideal annealing process, required by the new conditions, has been obtained. The rapid decomposition of cementite into pearlite and graphite is not enough to make a good malleable casting and an effort should be made to understand more fully the annealing treatment required for metals of varied composition. With regard to steel, it cannot be denied that we have here a material much superior physically. Notwithstanding its terrible propensity for blow-holes, etc., and the many problems that confront the founder of mild steel castings, I am convinced that great developments will take place in this industry in the immediate future. In this development, the electric furnace will play an important part.

### *Shrinkage of Malleable Iron*

In the accompanying illustrations, Fig. 1 is a graphic representation of the shrinkage of malleable iron. Most malleable founders have experienced difficulties from cracking and other causes as a result of variable shrinkage. It will be noted that, while the shrinkage in the white casting only varies slightly in low and high silicon, the annealing produces a further shrinkage in the low silicon and an expansion in the high silicon iron. The two lines at the left, Fig. 1, indicate the shrinkage in the white casting, while the other two lines represent the shrinkage of the annealed casting. This phenomenon is of the utmost importance, both to patternmakers and molders and further indicates the necessity of a thorough knowledge of irons in use. Time only permitted the four tests indicated in Fig. 1, as otherwise a few tests would have been made between silicon limits of 0.50 per cent and 0.70 per cent, which would have determined the neutral zone where no further shrinkage or expansion takes place with annealing.

Fig. 3 is a graphic representation of the increase in hardness, measured by the Brinell machine, of steel and malleable iron as annealed and the same material quenched in water from 820 degrees Cent. It will be noted that in the first set all the samples are machinable and while they vary considerably, that variation is much smaller than shown in the quenched state. The steels vary according to the carbon content, but no heat treatment would ren-

der a 0.15 per cent steel unmachinable. The malleable specimens, however, with a few exceptions, are quite unmachinable after this treatment. Since certain brazing and other operations approximate this treatment, it is of value to know which type of malleable is unsuitable for receiving any subsequent heat treatment.

Referring to Fig. 3, it may be stated definitely that any cast malleable of high silicon content, in which a large amount of carbon is left in the graphitic and combined form, is unsuitable. Even a black heart malleable containing no combined carbon is hardened considerably after quenching. The most suitable iron for this purpose is a low silicon, fairly high sulphur metal, in which the annealing is accomplished by the heavy removal of carbon and in which there is a non-hardening ferrite edge, as shown by sample No. 7. Sample No. 5 indicates that even with high silicon, intelligent annealing will produce this non-hardening ferrite edge which is absent in most of the samples tested. The extreme hardness of these samples unfortunately prevented the making of analyses to indicate the exact change in the amount of combined carbon after quenching. Time did not permit the making of microscopic examinations.

Fig. 4 is a microphotograph of white pig iron used for malleable iron.

Fig. 5 is a microphotograph of pig iron used for steelmaking.

Fig. 6 is a microphotograph of spiegeleisen used for bringing back the steel baths.

Fig. 7 is an enlargement of photomicrograph *C*, shown at the extreme right, Fig. 15, and is enlarged 1,200 diameters.

### *Microphotographs of Cast Steel*

Fig. 8 contains microphotographs of steel as cast, annealed and oil-quenched. The fact that annealing the steel increased the impact figure from 10 to 30-foot pounds is sufficient proof that annealing considerably improves the quality of the steel. As the question of cost, however, plays a large part in the plans of many steel foundrymen, I do not think that I should suggest that all steel castings should be annealed. The quality of a good steel casting is so good, even as cast, that due consideration must be given to the work to which a casting is subjected in order that the advantages of annealing may not be counterbalanced by the increased cost of manufacture. Where possible, however, a short annealing treatment to release casting stresses is almost necessary. A muffle treatment of from two to six hours duration, according to size and section, at 900 to 960 degrees Cent., and cooling slowly in sand or lime, will meet this requirement. This treatment, however, must not be confused with annealing, as no great alteration to the physical properties must be expected by its use. The main value of annealing, of course, is in the alteration of structure, which produces the change in physical properties.

### *Oil-Quenched Specimens*

Referring to Fig. 8, it naturally would be expected that the coarse, angular ferrite and pearlite would be comparatively brittle, while the breaking down of this structure to the more rounded annealed structure indicates a corresponding gain in toughness and ductility. The oil-quenched specimen shows a further breaking down to the fine structure illustrated. It is advisable, however, where oil quenching is resorted to, that such treatment be followed by a tempering treatment. The lead bath is the most effective method of performing this operation and five hours at a temperature of 550 to 570 degrees is a suitable treatment.

Fig. 9 is a photomicrograph, enlarged 1,200 times, of *C*, Fig. 18. This is the photomicrograph shown at the extreme right at the top of this illustration.

Fig. 10 shows very light, mild steel castings as made and also distorted to show their ductility.

Fig. 11 is an enlarged photomicrograph of the photomicrograph *B*, shown in the center of Fig. 21.

Fig. 12 is a photomicrograph of *C*, Fig. 21, enlarged 1,200 diameters.

Fig. 13 is an enlarged photomicrograph of *A*, shown at the extreme right, Fig. 22.

Fig. 14 is a photomicrograph enlarged 1,200 diameters of *C* at the extreme right of Fig. 23.

The following illustrations, Figs. 15 to 25, inclusive, are of a composite nature, illustrating the microscopical, chemical and physical methods of examination. The bars showing the bend tests were 1 inch and ½ inch square in every case. The fractures shown were the fractures of each particular bar at the breaking point. The microphotographs in the foregoing illustrations have been referred to as *A*, *B* and *C*. *A* represents the edge of the structure, *B* the structure between the edge and the center, and *C* the center, except in cases specifically mentioned, where *C* was a high magnification of *B*. In the table of physical properties, *U. S.* indicates the ultimate strength in tons, the yield point is given in tons and the elongation and contraction in area in per cent. *H.* indicates the Brinell hardness factor and *Imp.* represents the impact in foot-pounds as measured by an Avery pendulum machine. The various lots represent samples of malleable iron and steel produced by the leading makers in England. The bars were not ordered as test bars, but the best quality malleable iron was asked for. The tensile tests were made on an Olsen machine of 100,000 pounds capacity and were checked on an Avery machine.

Fig. 15 is a sample of English black heart malleable. Photomicrograph *A* shows the edge, *B* the center as polished and *C* is the center as etched.

Fig. 16 is another sample of black heart malleable, photomicrograph *A* showing the edge, *B* the next edge and *C* the center.

Fig. 17 is a sample of so-called neutral black heart malleable, in which photomicrograph *A* shows the edge, *B* the next edge and *C* the center.

### *Samples of English Reaumur*

Fig. 18 is a sample of English Reaumur malleable, photomicrograph *A* showing the edge, *B* the next edge and *C* the center.

Fig. 19 is another sample of English Reaumur malleable, in which photomicrograph *A* shows the edge, *B* the center and *C* the center enlarged 1,200 diameters.

Fig. 20 is a sample of high silicon English Reaumur malleable, photomicrograph *A* showing the edge, *B* the center and *C* the center enlarged 1,200 diameters.

Fig. 21 is another sample of English Reaumur malleable, photomicrograph *A* showing the edge, *B* the center and *C* the center enlarged 1,200 diameters.

Fig. 22 is still another sample of English Reaumur malleable, photomicrograph *A* showing the edge, *B* the next edge and *C* the center.

Fig. 23 is another sample of English Reaumur malleable, photomicrograph *A* showing the edge, *B* the center and *C* the center enlarged 1,200 diameters.

Fig. 24 is a sample of mild converter steel. Photomicrographs *A* and *B* show the steel as cast and *C*, the steel as annealed. In the top line are given the physical properties of steel as cast and the bottom line gives the physical results as annealed.

Fig. 25 is a sample of mild electric steel. Photomicrographs *A* and *B* show the steel as cast and *C* as annealed. The top line shows the physical properties of steel as cast and the bottom line the steel as annealed.

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A 32-page illustrated booklet has been issued by the American Steel Foundries, New York, to explain the advantages of the type of cast steel car wheel manufactured by this company. Full page illustrations in color show the wheels in various stages of manufacture and numerous tables give comparative information regarding rolled steel, cast iron and cast steel wheels.

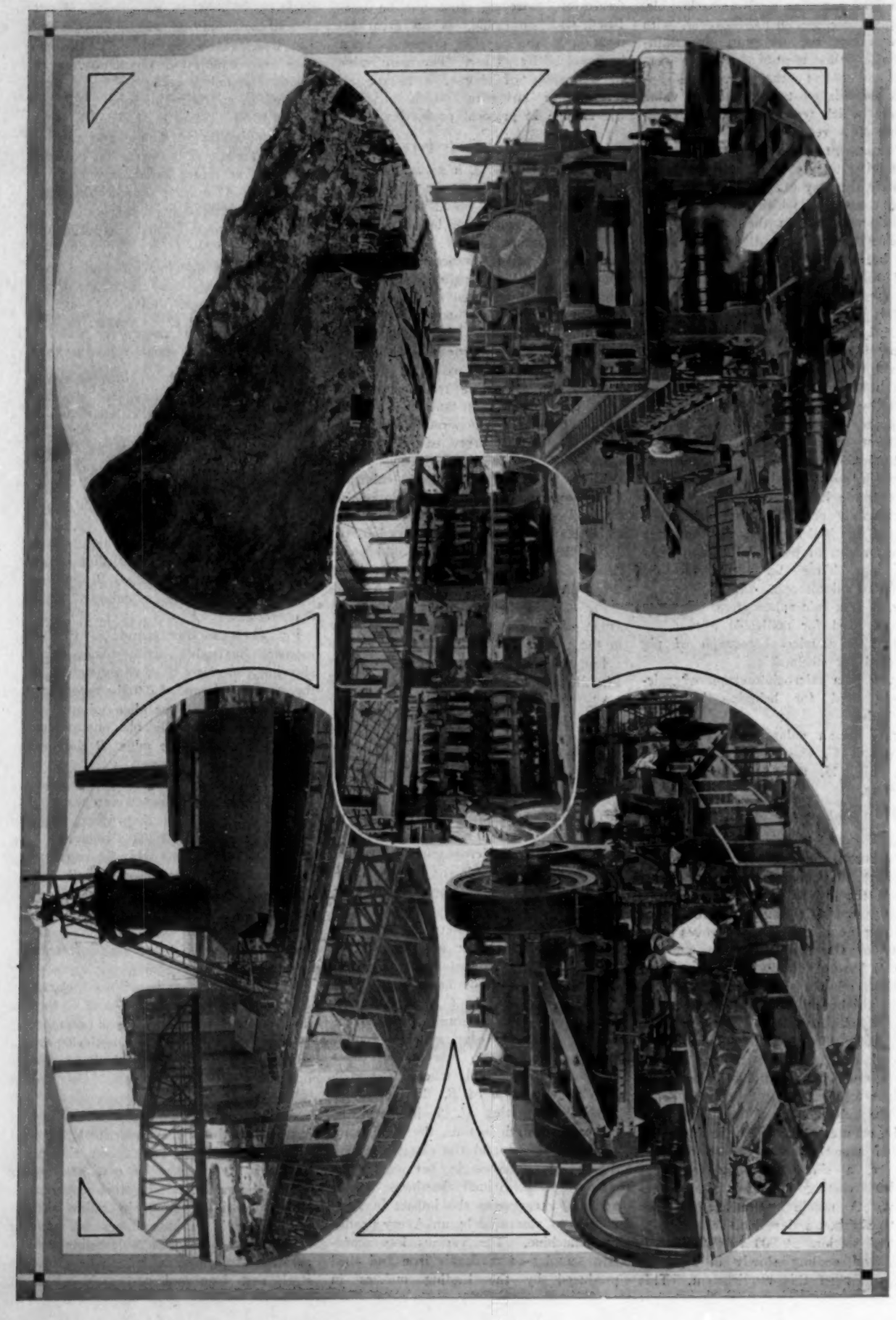


FIG. 1—FIRST BLAST FURNACE BUILT IN AUSTRALIA FIG. 2—ORE DEPOSIT AT IRON KNOB
FIG. 3—RAIL MILL AT NEWCASTLE STEEL WORKS
FIG. 4—POWERFUL BLOOM SHEAR FIG. 5—BREAKING DOWN INGOTS ON BLOOMING MILL

# Australia's First Steel Plant

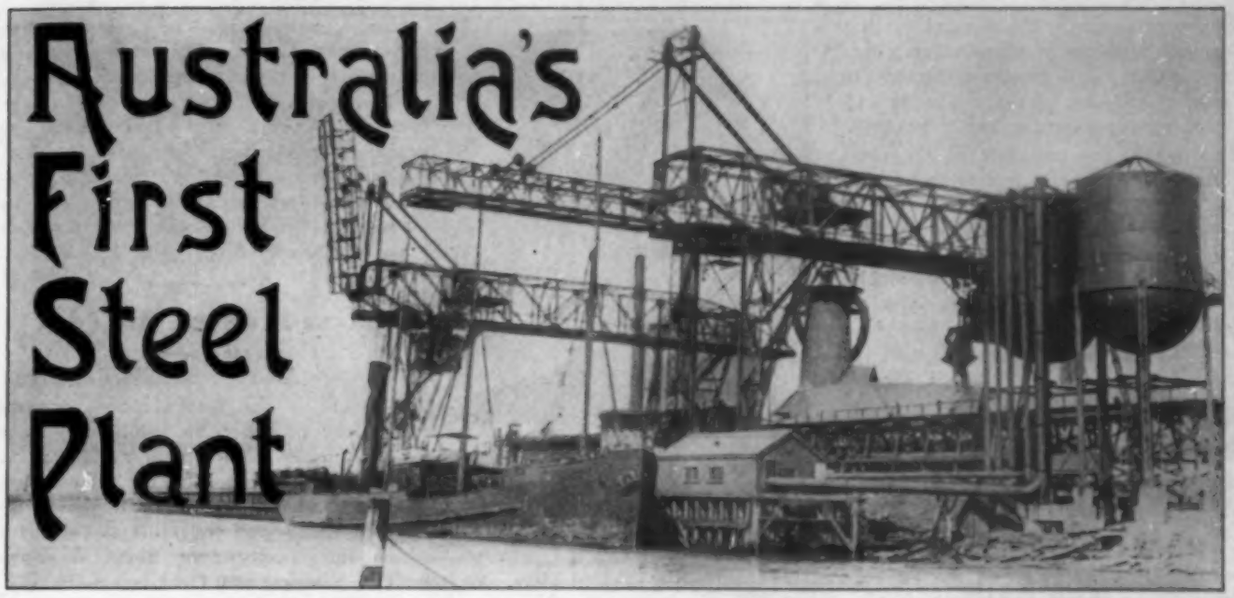


FIG. 5—BREAKING DOWN INGOTS ON BLOOMING MILL

AUSTRALIA'S entrance into the ranks of iron and steel producing countries has proved highly advantageous both to the big island commonwealth and to the cause of the Allies. The new steel works has been in operation about a year and its profits far exceed the most extravagant estimates of its promoters. By making Australia more self-contained, the new steel plant has freed English capacity and permitted more war supplies to be produced.

The accompanying illustrations show the principal features of this new Australian steel works. The views are taken from among a number recently received in this country. The plant is located at Port Waratah, near Newcastle, New South Wales. It is operated by the Broken Hill Proprietary Co., Ltd., which also operates zinc mines and smelters.

Iron ore is mined at the Iron Knob and Iron Monarch deposits in South Australia, transported to Spencer's Gulf by rail and thence to Newcastle by steamer. The ore averages 68 per cent in iron, and the prospecting that has been done indicates a large tonnage is available.

The blast furnace and steel plant were built largely on piles, their present site having been low-lying land. The blast furnace foundation is a concrete block, 44 feet square and 17 feet thick while the concrete foundations for the hot-blast stoves are 132 x 29 x 15 feet thick.

### *Similar to American Furnaces*

The ore unloaders have 6-ton grab buckets. The blast furnace is built on American lines and is equipped with a skip hoist. The furnace is 98 feet high, and has a rated capacity of 350 tons a day. It is served by four hot-blast stoves. The plant has complete equipment for converting the pig iron into finished steel products. This equipment includes open-hearth furnaces, a blooming mill and a combination rail and structural mill. The capacity of the plant is 400 tons of steel a day, or about 120,000 tons of finished rails per annum. The structural shapes now being rolled include 3 x 3-inch angles, and beams up to 24 inches. A by-product coke oven plant is also in service, comprising 66 Semet-Solvay ovens, producing daily 350 tons of coke, 6,000,000 cubic feet of gas, 40 tons of sulphate of ammonia and 30,000 gallons of tar.

The greatest demand in the Australian steel market under normal conditions, is for rails. Ambitious plans for new railroads were under consideration by the different states when the war broke out. The normal imports of rails are 150,000 tons yearly. The Broken Hill company is thus assured of a steady demand for its rails for years. The expanding demands of a country under development, like Australia, mean also a good market for bars, wire, sheets, locomotives, pipe, tubes, bridges, plates and

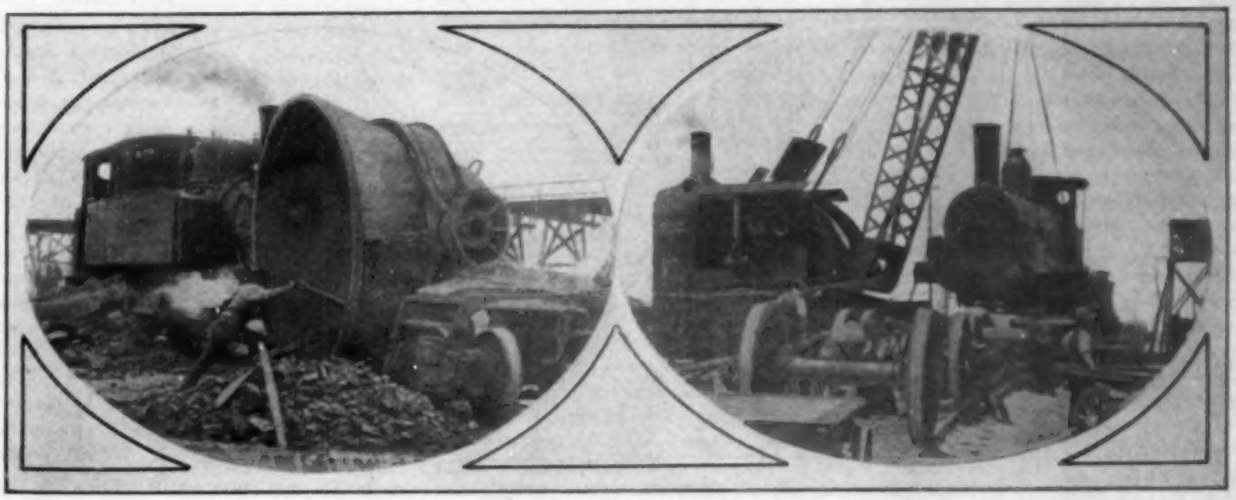


FIG. 6—CLEANING SLAG POTS

FIG. 7—CRANES LIFTING A LOCOMOTIVE

FIG. 4—POWERFUL BLOOM SHEAR

structural shapes. The demand for galvanized products is already heavy, and the Broken Hill company through its control of zinc mines is in an advantageous position to meet this trade.

The American manager of the plant, David Baker, asserts that the assembling cost of the ore, coke and limestone at the Broken Hill plant is lower per unit of iron produced than that of the United States Steel Corporation. The high iron content of the ore permits the production of a ton of pig iron from each 1.5 tons of ore, compared with 1.85 tons in the United States, 2 tons in Sweden and Russia, 2.4 tons in Great Britain and Germany, 2.7 tons in France and Belgium, and 3 tons of native British ore.

## Find Old Steel-Capped Iron Rails

Considerable interest was aroused recently among steel rail producers and railroad men, by the appearance, in a railway scrap list, of a tonnage of iron rails with steel caps. It had been thought that these rails, rolled about 40 years ago, considerably before the advent of steel rails, had long since disappeared in junk. The interest in this announcement was heightened by the discovery of some of this type of rail in service, at the Joliet works of the Illinois Steel Co. The accompanying illustration is from a photograph of a piece sawed from a rail which is now in use in the track leading from the open-hearth furnaces to the stripping house. It will be noted the hard steel head shows comparatively little wear after 40 years of service, under heavy loads and constant travel. This rail has been in place at least 30 years. It was rolled at the mill of the Cleveland Rolling Mills Co., Cleveland. R. D. Mathias, who is a veteran railmaker at the plant of the Illinois Steel Co., South Chicago, relates that at that time he was employed by a steel company at Hamilton, Ont. Hearing that the Cleveland mill was rolling such a rail, he was sent to Cleveland to see the process, but was not sufficiently impressed to recommend its adoption at Hamilton. The

SECTION OF IRON RAIL WITH STEEL CAP, NOW IN USE AT JOLIET WORKS OF ILLINOIS STEEL CO.

Cleveland mill rolled this section only a year or two; a considerable tonnage, however, being taken by an eastern railroad. Trouble resulted, owing to a tendency of the steel cap to loosen from the head at joints and curl up under the car wheels. This was a frequent cause of wrecks, several passengers being impaled by the steel bar passing up through the car floor. As rolling stock became heavier and speeds greater, these rails were taken out of main tracks and placed in sidings. Under these circumstances their rolling was discontinued. New processes of making steel brought in the all-steel rail, shortly afterward.

The accompanying drawing was prepared under direction of Mr. Mathias, from his recollection of the method of crimping the steel cap on the rail head. At the left are shown the ends of the rolls forming the iron rail. In the right end of the rolls, outside the housing, the final pass admitted the web and flange without more compression than was necessary to give traction, with a space at the head to admit the steel cap. This was in effect a *U* bar, the edges of which were turned under the lower curve of the head and clamped. The change in shape of the steel cap is illustrated in the cross section of the rolls, the rail traveling in the direction of the arrow.

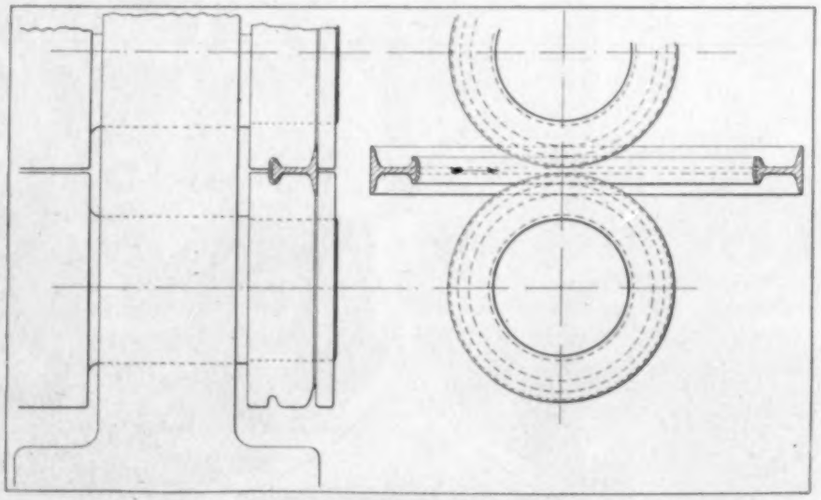


DIAGRAM SHOWING FINAL PASS CRIMPING STEEL CAP ON HEAD OF IRON RAIL, ALSO CROSS SECTION OF ROLLS SHOWING HOW STEEL CAP IS CRIMPED IN FINAL PASS

## Una-Flow Engines for Rolling Mills

Some of the first una-flow engines for use in American rolling mills are now under construction at the plant of the Nordberg Mfg. Co., Milwaukee, Wis. These engines will drive 12-inch and 9-inch rod mills at the plant of the Youngstown Sheet & Tube Co., Youngstown, O.

The cylinder of each engine is a plain cylindrical casting, all valve chambers and steam passages being contained in the heads, bolted to the ends of the cylinder. The steam valves are of the poppet type, the valve cages being separate castings which are ground into the heads. The valves are of the double beat, balanced poppet type, and are operated from the lay shaft by a releasing valve gear with spring dashpots, the cut-off being under control of the governor through a wide range of loads. The steam enters the cylinder at the bottom, sweeping up over the heads and jacketing them before entering the valve at the top. The exhaust is through the ports in the center of the cylinder uncovered by the piston near the end of its stroke. Relief valves of the poppet type with cataract dampening device are located near the bottom of the heads. Steam will enter the engines under approximately 170 pounds pressure, 70 degrees superheat and 20-inch vacuum, the steam being condensed by barometric jet condensers. The cylinder of the larger engine is 44 x 50 inches, and will provide a capacity of from 700 to between 3,000 and 4,000 horsepower. The weight of the engine, including a 110,000-pound flywheel, will be approximately 480,000 pounds.

# WHAT'S WHAT and WHY

*Don't Ask Yourself-Ask Us!*

**Questions from our Readers answered by Experts**

## Aluminum Coated Steel Sheets

*Will you kindly advise us if aluminum coated steel sheets are manufactured in the United States? If so, would they be durable for outside work where exposed to the atmosphere?*

Aluminum coated steel sheets have been manufactured in the United States for several years. Theoretically, these sheets should be very durable, and should withstand atmospheric conditions. However, we have not collected any data relative to their durability, and we would advise that you make inquiries of the railroads and mining companies using such sheets. The service tests are much more reliable and useful than the laboratory tests.

## The Sherman Law

*I want to get some information regarding the history of the operation of the Sherman anti-trust law, from the time of its passage to date, prosecutions that have been brought under it, and the attitude of the different administrations in the enforcement of it, in fact, I would like as complete a history on this subject as possible. Do you know of any place where such information can be procured, or of any book written on the subject?*

An excellent book on the Sherman anti-trust law was prepared by Albert H. Walker, of the New York bar, and published in 1910 by the Equity Press, 97 Reade street, New York City. This book is entitled *"History of the Sherman Law of the United States of America."* Another good book on the subject, entitled, *"The Anti-Trust Act and the Supreme Court,"* was written by former President Taft, and published in 1914 by Harper & Bros. Both of these books can be obtained at any good book store. There is also a pamphlet dealing with the Sherman law which was published by the government in 1912. The present administration has not found much use for the Sherman law, the principal suits instituted under it being those relating to the Reading case and the American Can Co. case.

The Clayton act which was passed at the sixty-third congress, is, of course, supplemental to the Sherman law, while the federal trade commission act, passed at the same session, is both supplemental to the Sherman law and legislation of the new charter, forbidding, as it does, any but fair business methods of competition.

## South American Iron Ore Deposits

*Are there any recognized iron ore deposits in South America, other than those recently developed by the Bethlehem Steel Corporation?*

There are several large known iron ore deposits in South America other than those developed in Chile by the Bethlehem interests. One of the principal ore fields is known as the Minas Geraes iron ore district, about 300 miles north of Rio de Janeiro. This ore is a hard, dense hematite, said to have the following composition: Iron, 69.65 per cent; phosphorus, 0.0125 per cent; silica, 0.24 per cent, and moisture, 0.38 per cent.

## Meaning of Invar

*Will you explain what is meant by "invar", which I have seen mentioned from time to time in discussions of special steels?*

Invar is a patented term and is applied to a steel alloy containing 36 per cent nickel. It has the lowest coefficient of expansion of any alloy so far produced. This gives it special value in instruments of precision as it is affected but very little by ordinary temperature changes.

## Pulverizing Cast Iron Borings

*Will you kindly advise us if any machines are available capable of reducing cast iron borings so that they will pass a 200-mesh screen?*

A number of standard crushers of the swing hammer and rotary types are manufactured for crushing cast iron borings, but it is doubtful if there is any machine on the market which will reduce the material to the fineness you require. Where a very fine product is required, it is customary to discharge the product of a crusher onto a vibrating screen of suitable fineness. The screen permits the finely ground particles to pass through and holds back the tailings or large particles, which are returned to the pulverizer for further reduction. In this manner exceedingly fine reduction can be obtained, working with any material.

## Design of Laboratory Hood

*Can you suggest a good form of hood for our testing laboratory, the design to be specially well lighted and ventilated?*

For good ventilation, locate the vent holes in the sides of the stacks instead of in front of them as is so often done. You will find that the draft will surely be better from the side. For efficient lighting, make the top of the hood of armored glass and locate electric lights with suitable reflectors over the glass top.

## Price of Tungsten Ore

*What is the present price of tungsten ore?*

Tungsten ore concentrated to 60 per cent or more of tungstic acid is selling at $40 per unit. A unit is 20 pounds. Hence a short ton is worth $4,000.

# Shop Illumination Is Standardized

*THE FOLLOWING article describes the new lighting code, for factories, mills and similar places, which has been prepared by committees of the Illuminating Engineering Society—The code was developed primarily for industrial commissions as an aid in legislation, but will prove useful to the shop owner*

A LIGHTING code, for factories, mills and other work places, which has been prepared by committees of the Illuminating Engineering Society, in order to make available authoritative information for legislative bodies, factory boards, public service commissions and others who are interested in enactments, rules and regulations for better lighting, contains numerous valuable suggestions.

Its language has not been drafted according to legal phraseology, but is simple and pointed throughout, thus being readily available for transforming into legal orders, and at the same time as a working guide in practical design and installation work. The code is, in part, as follows:

All buildings hereafter constructed must be provided with adequate window area. Awnings, window shades, diffusive or refractive glasses must be used for the purpose of improving daylight conditions or for the avoidance of excessive brilliancy, wherever they are essential to these ends.

The windows, skylights, saw-tooth or other roof lighting constructions, are to be arranged with reasonably uniform bays, and the daylight openings shall be so designed and proportioned that at the darkest part of any work space, when normal exterior daylight conditions obtain, there shall be available at least a minimum intensity equal to three times the minimum intensities required for artificial light. The intensity requirements for daylight are higher than those for artificial light, because the physical condition of the eye during the daytime is usually such as to require a higher intensity of natural light for satisfactory vision than is required at night, under ordinary well designed artificial lighting systems.

Old buildings not having adequate window area, must be provided with adequate artificial light, so as to supplement the natural light during normal daylight hours. All buildings, whether old or hereafter constructed, must be provided during those hours of work when natural light is insufficient or not available, with adequate artificial light. Adequate intensity of light must be provided for each class of work, both on a horizontal plane as well as on a vertical plane passing through the work. In all cases, however, glare on working surfaces is to be avoided, as it tends to reduce the visual efficiency of the workmen and to increase the likelihood of accidents.

The average illumination intensity throughout any month, actually measurable in foot-candles on a horizontal plane through the work, is to conform to the accompanying table. Uncertain cases which arise as to how to classify given manufacturing operations are to be left to the judgment of a lighting expert. The table of intensity is as follows:

| Class of work. | Minimum foot-candle intensity. | Desirable foot-candle intensity. |
|---|---|---|
| Storage, passageways, stairways, and the like..... | 0.25 | 0.25— 0.5 |
| Rough manufacturing and other operations ..... | 1.25 | 1.25— 2.5 |
| Fine manufacturing and other operations ..... | 3.50 | 3.5 — 6.0 |
| Special cases of fine work .... | | 10.00—15.0 |

Where operations are performed on the sides of the work in hand, they shall be classified according to this table, and if the illumination is furnished from an overhead system, it shall preferably be not less than 50 per cent of the foregoing values, when measured on a vertical surface. If the illumination is furnished by an individual lamp or by lamps close to the work, the intensity shall conform to the minimum or desirable intensities required in the foregoing table. As a guide to inspectors and others, it may be stated that with modern lamps roughly one candlepower per square foot produces an effective illumination of three foot-candles when the lamps are arranged according to the uniformly distributed overhead system, with mounting heights ranging from 12 to 16 feet above the floor, and when the light is directed from said lamps to the work in an efficient manner. A rough idea may thus be secured of the candlepower per square foot necessary to conform to the foregoing table of intensities by taking one-third of the intensity values given in the foregoing table. Thus for fine manufacturing and other operations, the minimum foot-candle intensity is 3.5, which is approximately equal to 1.2 candlepower per square foot. The use of a portable photometer or illuminometer, however, is recommended for the determination of existing systems and all uncertain cases are finally to be established by these instruments.

Lamps and machinery jointly, are to be so arranged as to avoid casting shadows over belts and other obstructions on important parts of the work, and the distribution of light from the lamps should be such as to avoid sharp contrasts of light and shade on the work. Inspection and regular maintenance of all lighting systems is required in spaces where work is being conducted, and in no case must the lighting devices, whether windows, lamps or auxiliaries such as globes and reflectors, be allowed to deteriorate, due either to dirt accumulations or to burned-out lamps, more than 20 per cent below the minimum intensity values required. Roadways, yards and places not usually frequented must either be provided by illumination during working hours when natural light is absent or partly absent, to make them safe against accident to employes traversing or engaged in such places; or a convenient control or controls must be placed at the entrance to basements, stock rooms and the like, so that one can readily turn on the lamps before entering.

Stairways and passageways must be provided with lamps and reflectors or shades carefully located so as to shed their light generally over the entire space or spaces involved, and in sufficient quantity to make the stairways and passages safe against accident to employes traversing or engaged in such places. Each working space is preferably to be illuminated by lamps mounted overhead, according to the system of general lighting, in preference to individual lighting. The overhead method of lighting, besides possessing many other advantages, also tends to reduce dark spots throughout the floor area, a feature usually objectionable with the use of individual lamps. This is not an absolute requirement, but a suggestion enforceable at the discretion of a lighting expert. Auxiliary lighting should be provided in all large work spaces, such lamps to be in operation simultaneously with the regular lighting system, so as to be available in case the latter should become temporarily deranged.

# Will There Be An Ore Shortage?

## Consumption of Lake Superior Iron Ore

RECORDS of *The Iron Trade Review* show that the 241 blast furnaces which operate constantly on Lake Superior ore produced 15,325,000 tons of pig iron in the first half of this year. This compares with 9,755,000 tons in the first six months of 1915. Allowing 1.85 tons of ore to a ton of pig iron, the lake ore consumed during the first half of this year was 28,350,000 tons against 18,050,000 tons in the corresponding period of 1915. If pig iron production in the second half of this year matches the last six months, the output of iron for the year will be 30,650,000 tons against an actual production of 24,000,000 tons in 1915. Ore requirements would be 56,700,000 tons this year against 44,400,000 tons in 1915.

From this requirement of 56,700,000 tons, a deduction of 1,150,000 tons must be made for furnaces using all-rail ore, leaving a required lake movement of 55,550,000 tons to supply those furnaces which always use Lake Superior ore. The shutting-off of the bulk of the iron ore imports through prohibitive ocean freight rates and the scarcity of tonnage, has thrown eastern furnaces into the market for more Lake Superior ore than ever before. It is reliably estimated that these furnaces will require 2,936,000 tons of Lake Superior ore this year. Last year they took 1,250,000. Canadian furnaces will use about 1,000,000 tons this year against 750,000 tons last year.

To precisely offset consumption in the usual market, in the east and in Canada, the lake fleet must move 59,486,000 tons this year.

## Ore Reserves in Furnace Yards

BLAST furnaces tributary to the Lake Superior district had close to 11,000,000 tons of ore in their yards on April 1, 1916. A year previous these stocks were authoritatively estimated at close to 16,000,000 tons. Coupled with the decrease in ore on docks April 1, 1916, compared with April 1, 1915, reserves decreased 6,500,000 to 7,000,000 tons during the 12 months ending April 1, of this year. The total apparent reserves on that date, however, were more than 16,000,000 tons, including yard stocks and dock balances. This reserve was unequally distributed, some furnaces having much more proportionately than others.

## Influence of Higher Stages of Water in Lakes

THE lake movement has benefited greatly from the higher water levels prevailing on the Great Lakes. This influence is exerted primarily at the Soo. An increased depth of 1 inch increases the carrying ability of a large lake freighter 80 tons. The increase this year has been 5 inches—or about 400 tons additional in each boat per trip. The greater depth of water has increased the lake fleet's capacity by 5 to 6 per cent, or approximately one-twentieth. On the basis of the 1913 movement, this means 2,500,000 tons.

## Other Factors Which May Influence Ore Supplies

THE blast furnaces have been driven at top speed for months. The number of stacks now idle, but which may resume, is small. It seems probable that production in the next six to nine months will not increase appreciably and may decline somewhat, due to furnaces blowing out for relining and repairs.

Fifteen bulk freighters are now under construction or have been ordered. Of these eight have gone or will go into commission this year.

Stockpiles at the mines were large, the ore in sight exceeding the available tonnage at the season's opening. Any shut-downs at certain properties might be offset in some measure by shipments from properties which were forced from the market by lack of vessel tonnage.

Lake shipments to date have exceeded every pre-season estimate. The June shipments surpassed any previous month by more than 1,000,000 tons and exceeded the best month prior to 1916 by 1,300,000 tons. A continuance of the June movement, or even a decline of 5 per cent, will meet all requirements.

## Shipments of Lake Superior Ore By Months for Past Six Years

| Year | April | May | June | July | August | September | October | November | December | Season* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1911.... | 331,645 | 3,684,819 | 4,819,996 | 5,221,373 | 5,548,311 | 5,231,069 | 4,769,965 | 2,523,253 | ..... | 32,130,411 |
| 1912.... | 204,042 | 5,919,074 | 7,567,555 | 7,600,233 | 7,760,248 | 7,287,230 | 7,010,219 | 4,072,674 | 14,579 | 47,435,777 |
| 1913.... | 866,387 | 7,284,212 | 7,974,444 | 8,204,416 | 7,684,285 | 7,259,662 | 6,526,103 | 3,270,958 | 18,545 | 49,070,478 |
| 1914.... | 269,686 | 3,852,063 | 5,502,367 | 5,784,514 | 5,869,477 | 5,431,307 | 4,242,392 | 1,068,681 | 1,411 | 32,021,897 |
| 1915.... | 503,832 | 5,012,359 | 6,005,091 | 7,204,020 | 8,081,117 | 7,863,146 | 7,146,873 | 4,445,129 | 57,236 | 46,318,804 |
| 1916.... | 1,658,411 | 8,449,580 | 9,507,576 | ..... | ..... | ..... | ..... | ..... | ..... | 19,615,567 |

*Seasons' totals will be found to vary slightly from the sums of the monthly movements, due to corrections.

## Pig Iron Production in Corresponding Months for Past Six Years

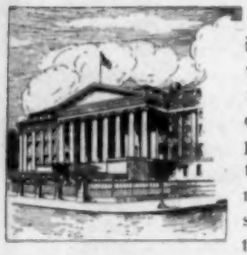
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1911.... | 2,044,904 | 1,871,388 | 1,773,282 | 1,776,108 | 1,921,832 | 1,973,918 | 2,092,061 | 1,999,100 | 2,032,301 | 17,484,894† |
| 1912.... | 2,377,621 | 2,503,341 | 2,433,737 | 2,402,567 | 2,500,163 | 2,444,454 | 2,683,645 | 2,639,562 | 2,777,292 | 22,762,382 |
| 1913.... | 2,754,353 | 2,816,825 | 2,616,883 | 2,558,275 | 2,537,018 | 2,494,098 | 2,539,924 | 2,229,960 | 1,976,138 | 22,523,474 |
| 1914.... | 2,261,501 | 2,097,019 | 1,904,566 | 1,955,324 | 1,996,483 | 1,882,718 | 1,767,227 | 1,501,269 | 1,495,325 | 16,861,432 |
| 1915.... | 2,114,518 | 2,255,157 | 2,369,932 | 2,563,311 | 2,774,825 | 2,834,342 | 3,120,340 | 3,035,235 | 3,201,605 | 24,269,265 |
| 1916.... | 3,225,496 | 3,364,584 | 3,213,818 | ..... | ..... | ..... | ..... | ..... | ..... | 9,803,898 |

†Totals only for the months indicated.

# Business News of Nation's Capital

## *Still Talking of Adding Iron and Steel Products to Taxable List in Revenue Bill—Fight on Copper Tax*

Bureau of *The Iron Trade Review*,
206 Corcoran Bldg.,
July 17, 1916.



The fight being made by western senators to have the copper tax provision of the omnibus revenue bill struck out continues to be the principal point of interest relating to that measure. It seems likely that the provision will be either eliminated or that other metals will be included in it for taxation. In this connection, there has been some consideration of the idea of adding pig iron and different forms of steel to the taxable list. Just how serious this proposal has become is a question, but at present it seems more likely that copper will be entirely exempted, than that pig iron and steel articles will be added to the list. There is also a sentiment in favor of rewriting the copper tax provision so that only copper entering into munitions of war will be taxed and that going into peaceful products be exempted. As the provision now stands, it is a misnomer to refer to it as a strict munition tax, for copper of all kinds would be subjected to a tax regardless of the purposes for which it is to be used. In the event that pig iron and semi-finished steel were placed upon the taxable list, the objection that it would not be a strict munition tax would, of course, also be well taken. The proposed tax on arms necessarily covers a considerable amount of iron and steel, so that further taxation on the industry would mean a double and even a triple tax.

The discussion as to the advisability of taxing iron and steel arose partly because of protests of copper interests. Some of them contended that their industry should not be singled out for taxation, but that, if they are to be taxed, iron and steel articles should also be made to bear their portion of the burden. It has been pointed out, however, that iron and steel have already been proposed for taxation by the bill as it passed the house because of the assessments provided for against munitions. The sub-committee having charge of the munitions tax feature of the bill is composed of Senator Stone, Missouri, chairman; Senator Thomas, Colorado, and Senator Hughes, New Jersey, all of whom are Democrats.

It is evident that, if they do see fit to tax iron and steel further, a strong protest will be made against their action. As the steel industry apparently is always considered a legitimate prey for any burden congress desires to place, the feeling that it might be made to stand increased taxation has been rather strong. There is no certainty, of course, that the industry will be further taxed, but the trade would do well to fight at the beginning against the possibility of such a plan materializing.

It is doubtful whether the revenue bill will be reported to the senate before next month. Present indications are that it will not be greatly changed from the form in which it passed the house, except with regard to the copper tax provision.

So far there has been comparatively little protest made by munitions manufacturers against the bill. Some of them object to the plan of placing the tax upon a basis of gross receipts, rather than net profits. It has been stated, however, that the bill gives ample protection in this direction because those whose net profits are under 10 per cent are exempted from taxation. One manufacturer complained that while he had received some large munition orders, he had turned all of them over to sub-contractors, who would be the only ones making profits from these particular orders, and thought it would be plainly unfair to tax him on gross receipts because they would include the amounts for the orders from which he received no profits. A member of the sub-committee having the munitions tax provision in charge said that this manufacturer is mistaken as to his conclusions and would not have to pay a cent of tax on gross receipts from such orders.

## Pig Iron Rates

Washington, July 18.—The interstate commerce commission rendered an opinion last week that the Louisville & Nashville and Tennessee, Alabama & Georgia railroads do not have to apply rates on pig iron from Ironaton and Shelby, Ala., to Chattanooga and Boyce, Tenn., over routes other than those now provided. The complainants, the Chattanooga Implement & Mfg. Co., and other pig iron consumers of Chattanooga wanted to have the routes increased, as formerly, but the commission held that the new rates, 75c and 80c per gross ton from Ironaton and Shelby to Chattanooga and Boyce, respectively, over a route through Gadsen, Ala., afford the complainants ample protection.

## Nickel Exports

*From Canada to the United States May be Stopped*

Toronto, July 17.—The announcement that the German submarine Deutschland will ship a cargo of nickel at Baltimore for the German government has revived the agitation for the prohibition of the export of nickel ore to the United States. Public feeling has been strongly aroused by statements in the press that the shipment is the product of Canadian nickel ore. The Canadian government has issued a statement that any nickel secured by the Germans in the United States is from other than Canadian sources, quoting from a report by Major Graham A. Bell, who, under arrangements between the British and Canadian governments, has been entrusted with the duty of supervising the destination of Canadian nickel refined in the United States, to the effect that there is a considerable quantity of nickel ore obtained from copper mines in the United States, as well as some from New Caledonia ore. The government statement adds that the British government is satisfied that the precautions taken are sufficient to prevent the enemy from receiving nickel supplies derived from Canadian ores. Hon. G. Howard Ferguson, Ontario minister of mines, has also given a strong denial to the report.

**Large Capital.**—The Trinity Coal & Iron Corporation has been incorporated at Dover, Del., with a capitalization of $10,000,000, to acquire lands containing coal, iron, lead, zinc, copper, etc. The incorporators are Clarence J. Jacobs, M. L. Rogers and Harry W. Davis, all local Wilmington parties.

# News of Employers and Employes

*Government Report Shows Substantial Wage Increases—*
*Chicago Labor Agitators Sentenced*

WASHINGTON, July 18.—The largest wage increases made by manufacturing concerns in the United States during the fiscal year 1916 ended with June were made by the iron and steel industry, according to the bureau of labor statistics, department of labor. Most steel plants raised wages last May, and for many this was the second raise granted during the year. Total increases amounted to from 5 to 30 per cent. The inquiry as to wage increases in the iron and steel industry covered 142 plants, of which 102 reported for May. It showed there were 156,126 employes on the pay roll, as compared with 118,545 for the same month in 1915, the amount of increase in number employed being 31.7 per cent. The total pay roll was $6,043,820, as compared with $3,572,210 for May of last year, the per cent of increase in the total pay roll being 69.2 per cent. The increase in wages in the iron and steel industry was 9.2 per cent over the amount paid in April, 1916.

On the blank forms sent to the iron and steel plants two questions have been carried for several months: (a) Total number of persons on the pay roll; and (b) number actually working on the last full day of the pay period. The figures for these two inquiries, of course, differ in any plant having a shifting force, as the first counts every individual name on the pay roll, including all persons who worked the whole or any part of the pay period; while the second inquiry counts only those who were working on one particular day, the last day of the pay period in which the plant was in operation a full-length day, thus excluding a half-holiday Saturday or other irregular short day when the force might not have been quite normal.

Figures based upon these inquiries show that the 87 plants reporting employed 92,954 men in May, 1915, as compared with 123,526 in May, 1916, an increase of 32.9 per cent. In addition, 94 plants reported 120,392 employes actually working on the last full day of the pay period reported for in May, 1916, as against 115,247 reported for in April, 1916, an increase of 4.5 per cent.

Ninety-one of the 101 establishments reporting, announced increases in rates of wages since May 1, 1915; 10 only reported having made none. Seven other establishments reported as to volume of employment, but did not answer this question. Of these 91, 83 increased wages in May, 1916, and for 71 of the 83 this was at least a second increase during the 13-month period. One establishment reported having advanced its rates every 60 days, with aggregates of from 15 per cent to 30 per cent in the different departments. February, 1916, ranks next to May in increases, 38 establishments reporting advances during that month.

One-half the increases made were of 10 per cent each, with a range in the several increases of from 5 per cent to 30 per cent, aggregating 33 per cent in one establishment, and 45 establishments reported two increases of 10 per cent each. In nearly every case approximately all the employes of the establishments were affected by the increases, although three establishments reported that common labor only was benefited. These increases were not confined to any one district, but have been general in establishments in the eastern, middle western and southern states. There were 21 strikes in iron and steel mills in May, 1916. Between Dec. 1, 1915, and June 1, 1916, 1,432 labor disputes were reported, while during 1915 the number was 1,405.

Taking up the question of accident prevention, the department points out that in 1916 the United States Steel Corporation began to systematize and standardize the safety work which its subsidiaries had undertaken. A chart tracing the accident record for the nine years, 1906 to 1915, shows a reduction for each year over 1906 as follows:

1907, 10.40 per cent; 1908, 18.21; 1909, 25.28; 1910, 43.49; 1911, 41.26; 1912, 36.06; 1913, 38.29; 1914, 40.52; 1915, 43.54.

## Conditions in Canada

Toronto, July 17.—At a meeting of the provincial organization of resources committee, Dr. A. H. Abbott, secretary, presented a detailed report of labor conditions in the Toronto munition plants. Investigation had confirmed the general opinion that a considerable shortage of labor prevailed, especially as regards skilled labor, such as toolmakers and skilled mechanics. There was an almost equal need for general laborers. The shortage had given rise to many union labor troubles and a constant shifting of men from one establishment to another, which naturally operated to lessen production. A general lack of co-operation between recruiting sergeants and manufacturers, was also found, and it was recommended that some understanding should be reached by which men who are essential to the manufacture of munitions should be regarded as not subject to the call for enlistment. The labor stringency is being met by manufacturers in various ways, by the training of inexpert men and women, and by attempts to secure labor from distant points.

With regard to the employment of women, it was found that in the plants visited approximately 200 are now at work and the number is expected to be doubled in the near future. Women cannot be used on the heavier shells, nor does it seem wise to attempt their employment in operating machines where there is considerable danger of accident. Very few of the women have previously been engaged in factory work. Manufacturers state their willingness to pay women the same wages as men, provided they measure up in efficiency and general satisfaction.

## Agitators Sentenced

Chicago, July 17. — As a result of prison sentences for six and heavy fines for eight business agents of Chicago unions, the backbone of "wrecking gangs" in Chicago seems to have been broken.

Seventeen defendants, practically all business agents of labor unions were tried on charges of conspiracy to extort, to boycott, to commit malicious mischief and to obtain money under false pretenses. Three of the defendants were found not guilty while the others were given prison terms or fines.

This trial and its resulting convictions followed an exposure more than one year ago of terrorism and blackmail on the part of union business agents. The system followed was to approach a builder and demand blackmail as the price of avoiding a strike. Once the ball was started, evidence was gathered readily and indictments followed, the verdict verifying the justice of the grand jury action. Motion for a new trial was heard and denied, the court holding that evidence of guilt was overwhelming and that even if error had been made in

the trial, the higher court would not reverse in face of the evidence.

## Militia Called Out

Chicago, July 17. — Employes of Portland cement manufacturing plants at LaSalle and Oglesby, Ill., numbering about 1,200, went on strike last week and local dealers being unable to handle the resulting disorders, two companies of militia were sent to restore order.

The strikers walked out with a demand for recognition of the union. No attempt has been made to use strike breakers and little real disorder has resulted. The plants affected are those of the German-American Portland Cement Co., at LaSalle, the Marquette Mfg. Co. and the Chicago Portland Cement Co., at Oglesby, a suburb.

## Demand Eight Hours

Milwaukee, Wis., July 17.—Milwaukee machinists and patternmakers have addressed their demand for an 8-hour day at the same pay now received, to the employers and have authorized their officers and representatives to call a strike unless the demand is granted. The employers, who on July 1 voluntarily granted their men a reduction in the weekly working schedule from 55 to 52½ hours, are considering the demand. Both parties to the controversy are firm in their positions, but the feeling seems to be that the matter will be settled without actual walkouts.

The latest development in the situation is the action of the governor of Wisconsin, who dispatched a telegram from Madison to J. D. Beck, chairman of the industrial commission of Wisconsin, now in Milwaukee, requesting him to use the powers and authority vested in the commission to preserve industrial peace. The governor calls attention to a law which gives the commission power to intervene, and offers the good offices of the state to promote an adjustment of the impending dispute between the 6,000 to 7,000 machinists and patternmakers in Milwaukee county and the forty-odd employers.

## Will Insure Lives

Chicago, July 17. — E. P. Ripley, president of the Santa Fe railroad, announces that his company will pay not less than $250 nor more than $3,000 to the family of any of its 25,000 employes who die while in service, provided the employe has been in service for two years. The plan is to be put into effect on trial for two years and then may be made permanent or abandoned.

The amount of the benefit is computed by multiplying 5 per cent of the employe's last yearly salary by the number of years of his service. This is said to be the first railroad to insure its employes' lives. No exact data are available as to the cost, which probably is the reason the plan is to be placed on trial.

## Will Entertain Thousands

The Calumet & Hecla Mining Co. entertained its 5,600 employes and their families, numbering about 20,000 persons, July 15, at Calumet, Mich., this being the fiftieth anniversary of the founding of the company.

A feature of the event was the presentation by President R. L. Agassiz, of Boston, of gold, silver and bronze medals, to 1,355 employes in token of their long service. Gold medals were be given to 377 men who have worked for the company between 30 and 40 years, while 885 men have been employed more than 20 years and one man has worked 50 years.

Directors and their families from Boston, New York and other points in the east, were present.

The day included a parade, with an address and presentation of medals following and a picnic dinner provided by the company.

## Teaching Efficiency

A new system of wages is being inaugurated at the big plants of the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn. When the rush is over it is expected that there will be a weeding out of men, but that the competent employes will be retained. It is said that it takes 20 years to get a good working force together and the managers of the Remington plant have come to recognize the old established rule. The big plants have been gobbling up all kinds of men. Some who could not get a job in any factory in Bridgeport were sure of a chance at the Remington Arms Co. The company even drafted some first-class bootblacks and molded them into machine hands.

In the past few weeks a system of piecework instead of day wages has been inaugurated in many departments. There have been strikes of a minor character, which have not interfered much with production. So far the strikers are not attached to any union organization. It is confidently expected that in a short time there will be gradual lowering of the high scale of wages, which is the highest in the state. The company has also stopped building factory extensions at the Union Metallic company's plant.

## Will Pay Bonus

To enable its shop employes to participate in the unusual prosperity enjoyed by the company in common with other manufacturers, the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., will pay a bonus equal to 5 per cent of the wages earned during three months, from May 1 to July 29, both inclusive, by all laborers, machine operators, shop foremen, storeroom attendants and shop office clerks, who are then in the company's employ and who have been in the company's employ continuously for a period of not less than six months previous to June 15, 1916.

## On Uniform Basis

It is interesting to note that bar iron mill employes in plants controlled by the Amalgamated Association as well as those operating independently, now are on a uniform wage basis, namely, $8.40 a ton for boiling. If Amalgamated association officials succeed in advancing base rates at the Detroit conference, mills controlled by that organization will pay more than independent manufacturers of bar iron products. The A. M. Byers Co. and the Youngstown Sheet & Tube Co., as previously reported, are paying $8.40 a ton for boiling; that rate will remain in effect at plants operated by those concerns until further notice. Puddlers in the central west now are receiving the highest base rates to prevail since November, 1866, when $9 a ton was received for boiling.

Sheet and tin plate mill employes identified with the Amalgamated Association are not satisfied, it is learned, with the wage scales adopted at Atlantic City for the year beginning July 1, last. Prevailing wages are from 3 to 5 per cent above those in effect just previous to the signing of new scales.

The committee appointed to examine the sales sheets of the Brier Hill Steel Co., the Trumbull Steel Co. and the Newport Rolling Mill Co. for the 60-day period, ending June 30, 1916, found that the average invoiced selling price of Nos. 26, 27 and 28 gage plain steel sheets, f. o. b. mill, was 2.60c per pound. That figure entitled sheet mill workers to a 9-point rise over the base price of 2.15c for July and August. Prevailing rates are 13½ per cent above the base of 2.15c on prices contained in the scale book of 1916-1917

# Iron and Money: Fact and Comment

*Lackawanna Steel Earnings for Second Quarter of 1916 Exceed Best Previous Total*

*Year's Profits—Over 30 Per Cent Earned in Stock*

STEEL company earnings, although even now breaking all records, are mounting steadily. An example is given by the report of the Lackawanna Steel Co. for the second quarter of the current year. This is the first financial statement issued by a steel company for that period and is by far the best ever shown by the Lackawanna company. The profits for the three months were $3,067,273, or greater than the combined figures of all four quarters of 1913, totaling $3,023,084, the record for a full year prior to 1916. The surplus for the second quarter was $816,205, more than that netted in the first quarter, a gain equivalent to 36.25 per cent. The quarter's profits were at the rate of 30.61 per cent on the outstanding common stock. Profits for the first half of 1916 were $5,318,342, compared with a deficit of $297,374 in the corresponding period in 1915. The Lackawanna Steel Co. has paid off $4,500,000 of a $6,000,000 issue of notes since the present prosperity began and is about to take up $500,000 more, so that practically $1,000,000 only remains. The comparative income accounts for the second quarters of 1916 and 1915 are as follows:

| | Second quarter, 1916. | Second quarter, 1915. |
|---|---|---|
| Total net earn. after ordinary reprs. & main., but not renewals | $4,051,033 | $1,152,044 |
| Int. on bonds, debentures and notes | 368,833 | 402,500 |
| Sub. bonds, etc | 75,829 | 77,475 |
| Rentals and royalties | 25,359 | 25,359 |
| | $470,021 | $505,334 |
| Balance | $3,581,011 | $646,710 |
| Extinguishment mines & min'g investments | 82,597 | 74,654 |
| Dep. and renewals | 431,140 | 303,672 |
| | $513,738 | $378,326 |
| Profit | $3,067,273 | $268,384 |

The unfilled orders of the Lackawanna Steel Co. increased 60,981 tons at the end of the quarter. On June 30, they totaled 932,857 tons. The unfilled tonnage statements as of the end of each quarter over several years compare as follows:

UNFILLED TONNAGE.

| | |
|---|---|
| June 30, 1916 | 932,857 |
| Mar. 31, 1916 | 871,876 |
| Dec. 31, 1915 | 812,680 |
| Sep. 30, 1915 | 393,084 |
| June 30, 1915 | 283,979 |
| Mar. 31, 1915 | 229,910 |
| Dec. 31, 1914 | 160,160 |
| Sep. 30, 1914 | 166,344 |

## Iron and Steel Stocks

A table of stocks of leading iron and steel companies, showing quotations at the close of the New York stock exchange July 15 and net changes for the preceding week, follows:

| | Close July 15. | Net Chg. |
|---|---|---|
| American Can | 54½ | +1¼ |
| American Can, prfd. | 108⅜ | — ½ |
| Amer. Car & Fdy. | 54⅝ | +1¼ |
| American Locomotive | 61 | —3 |
| American Locomotive, prf. | 100 | ..... |
| American Steel Foundries | 45 | —1½ |
| Baldwin Locomotive | 68 | —1⅜ |
| Baldwin Locomotive, prfd. | 105½ | +1 |
| Bethlehem Steel | 444 | —5 |
| Colorado Fuel & Iron | 42 | —2¼ |
| Continental Can | 93 | —9 |
| Continental Can, prfd. | 108 | —2¼ |
| Crucible Steel | 57⅛ | —2⅜ |
| Crucible Steel, prfd. | 113 | —1¼ |
| General Electric | 164¾ | —2¾ |
| Gulf States Steel | 78 | —3 |
| Gulf States Steel, 1st prfd. | 92¾ | —3¼ |
| Gulf States Steel, 2d prfd. | 82 | —2½ |
| International Harv. of N. J. | 115 | +2 |
| International Harv. Corp. | 80 | —2 |
| Lackawanna Steel | 68½ | +3½ |
| Nat'l. Enamel'g & Stamp. Co | 22 | —1⅜ |
| Nat'l. Enamel'g & Stamp Co., prfd. | 95 | +2¼ |
| Pressed Steel Car | 43⅛ | —2⅜ |
| Pressed Steel Car, prfd. | 99½ | ..... |
| Pullman Palace Car | 162¾ | — ¼ |
| Republic Iron & Steel | 42⅜ | —2⅜ |
| Republic Iron & Steel, prfd. | 107½ | — ½ |
| U. S. Cast Iron Pipe & Fdy | 18½ | —1¾ |
| U. S. Cast Iron Pope & Fdy., prfd | 52⅛ | — ⅛ |
| United States Steel | 84⅜ | —1⅛ |
| United States Steel, prfd. | 117¾ | + ⅛ |
| Westinghouse Mfg. | 54½ | —1⅜ |

Following is a table comparing maximum quotations of iron and steel stocks not listed on the New York stock exchange at the close July 15 with those of July 8:

| | July 14 | July 7 |
|---|---|---|
| American Radiator | 399 | 400 |
| American Ship Building | 42 | 44 |
| Cambria Steel | 82½ | ... |
| Chicago Pneumatic Tool | 71 | ... |
| LaBelle Iron Works | 51½ | 51½ |
| Lake Superior Corp'n | 11⅜ | 11⅜ |
| Stewart-Warner Speed. Co. | 102¾ | 100 |
| Warwick Iron & Steel | 9½ | 9½ |
| Westinghouse Air Brake | 141½ | 144 |
| Westinghouse Elec. & Mfg. | 56¾ | 59¼ |

## Financial Crop Ends

The Mitchell Motors Co., Racine, Wis., which was formed to acquire the business of the Mitchell-Lewis Motor Co., has also made a contract to assume control of the Mitchell Wagon Works, Racine, which will afford facilities for the production of automobile bodies.

* * *

A syndicate headed by Crocker Bros., New York City, has been organized to refinance the Oriskany Ore & Iron Corporation, Lynchburg, Va. This furnace was built and the company's mine developed by W. W. Taylor, who for some years was general superintendent of the Alleghany Ore & Iron Co. Later Mr. Taylor and the late Robert L. Parrish, of Covington, leased from the Lukens Iron & Steel Co. the Alleghany Ore & Iron Co. and operated it successfully. Owing to the death of Mr. Parrish, the financing of the Oriskany Ore & Iron Corporation was not completed, the estate being without authority to continue it. For this reason, Mr. Taylor found it advisable to accept co-operation from people in the trade to refinance the undertaking. This having been done successfully, it is expected the original plan of development will be carried out. Mr. Taylor is given great credit in trade circles for the building of this furnace and the development of the mine, and no doubt will continue to manage its operation.

* * *

The reorganization plan of the Standard Roller Bearing Co., Philadelphia, is expected to be shortly declared operative since 90 per cent of the stock has assented to it. Labor difficulties in the plant are being cleared up, and a normal force will soon be at work.

* * *

The Worthington Pump & Machinery corporation, reports orders booked Oct. 1, 1915, to July 7, 1916, amounted to $13,352,794, against $6,628,861 for same period the previous year; unfilled orders at present are $6,702.00, against $2,089,900 July 7 last year. Net income available for dividends in April and May, were $236,805.

* * *

Tenders for the Nova Scotia Car Works were received recently by Judge Chisholm at Halifax. Bids were received from F. B. McCurdy & Co., $153,000, and from the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia, $152,500. Since both tenders were below the reserve price, $154,000, it was decided to sell the property at auction, July 26.

* * *

At a meeting held July 14, the stockholders of the Petroleum Iron Co. with plant at Petroleum, Pa., the proposition announced some weeks ago to increase the capital stock from $1,000,000 to $3,000,000 received favorable action. The increase in stock is reported to be for additions required to meet the increasing trade of the corporation. The Petroleum Iron Co. plans to distribute or dispose of $100,000 worth of the new stock among employes in a profit sharing plan.

In further connection with this stock issue the Pennsylvania Tank Car Co., a subsidiary of the Petroleum Iron Co., will meet Saturday to vote on a proposition to increase the capital stock from $500,000 to $1,000,000.

Announcement was recently made that the Petroleum Iron Co. has been awarded contracts for tank iron to be be used in the construction of an oil refinery near Houston, Tex., under control of the Petroleum Refining Co.

# Business War

*Must be Prepared For, Says Sir Chas. Allen—Talks About Spies*

Col. Sir Charles Allen, V. D., presiding at the annual meeting of the Ebbw Vale Steel Coal & Iron Co., in London, on June 29, congratulated the shareholders on having made record profits. As no additional share capital had yet been authorized by the treasury, these extensions had been financed temporarily by loans and bank overdrafts, hence the reason for the unusually heavy debit balance, which it was hoped to considerably reduce at an early date. They could hardly imagine their appeal for new capital for such important work would be declined by the authorities, as it must become a suicidal policy for the government to refuse and discourage capital expenditure upon the extension of British manufacturing concerns, provided they were developed on legitimate and proper lines, and it was only reasonable to contend that the development of iron ore deposits in Great Britain, to replace imports from Spain, was not only a wise and desirable undertaking for the benefit of this country, but the only sound principle in preparing for the expansion of British commerce and maintaining their supremacy in the world's markets directly peace was declared. The company, he said, would soon reach the stage of being one of the few iron and steel producing concerns in the country so self-contained as to possess all the British raw materials necessary for the carrying on of its business and converting the same into a variety of finished articles without the added expense and inconvenience of having to import a single ton of raw material from other countries. "We have to look to the future," continued Sir Charles, "and consider the chief perils our trade is threatened with. It is high time some one should speak out to refute the exaggerated notions impressed upon the minds of the general public concerning the wonderful German superiority and scientific skill in their methods of manufacture compared with this country. In my humble opinion, it is a delusion and a snare. So far as skill and science in connection with the manufacture of iron and steel are concerned, I do not hesitate to declare that the Germans cannot teach us anything. They have certainly excelled in unscrupulously and craftily pirating other people's ideas, as their representatives, who have hitherto had the privilege of being admitted to inspect establishments in this country were really commercial spies, trained to take the benefit of other people's brains. Therefore, it is imperative for the future welfare of our trade that these intruders should be wiped out. Let us hope that British manufacturers will, in future, combine to insist upon dictating a policy with a view to protecting their commerce and interests."

## Big Chemical Plant

M. J. Mandulay, of Havana, Cuba, has announced in St. Louis that a $2,000,000 smelting and chemical plant will be built in St. Louis immediately. Mr. Mandulay, who has been a guest at the Planters' hotel in St. Louis, said the contract had been let for the erection of eight buildings at the junction of the River des Peres and the Mississippi river, in South St. Louis, to the Fruin-Colnon Construction Co., and that work would be started at once. The buildings will be of wood and stone composition. They will be occupied by the Mineral Refining & Chemical Co., which was formed last January, he said. It is believed that the plant will begin turning out about 50 tons of a compound for the making of white lead by Sept. 30, and as soon as the plant is in full operation, it will be able to make from 100 to 200 tons a day.

## More Furnaces Sold

Sales of six additional Rennerfelt electric furnaces to manufacturers in this country are announced by Hamilton & Hansell, 17 Battery place, New York City. Several of these units are to manufacture ferro-tungsten, including one 2/3-ton 150-kilowatt furnace sold to the Tungsten Products Co., Boulder, Colo., and two furnaces, one of the 3-ton and the other of 6-ton type, which have been contracted for by other companies, the names of which are not made public at this time. Other new installations of Rennerfelt furnaces provided for include one 1/3-ton 100-kilowatt furnace to the Gerline Brass Foundry Co., Kalamazoo, Mich., and an identical unit to the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., both of which will be employed in the production of bronze. The Samson Iron Works, Stockton, Cal., also has purchased a ¼-ton 225-kilowatt furnace for making steel. These new installations will make a total of 14 of the Rennerfelt type in the United States. Three additional Rennerfelt furnaces have been sold in Europe bringing the total in the entire world to 64 furnaces.

The Macomb Sheet Metal Works, of Macomb, Ill., has changed its name to the American Steel Products Co.

# Electric Furnaces

*Are Increasing in Popularity With Steel Manufacturers*

New York, July 17.—A total of 28 heroult electric furnaces for steelmaking were authorized in this country and Canada during the first half of 1916, which exceeds by four the number licensed during the full year of 1915. At present a total of 72 heroult units are in operation, in the course of building or have been authorized in the United States and Canada. A large number of additional furnaces have been arranged for by various companies through licenses from the Steel Corporation during the past several weeks. These include two 6-ton to the Timken Roller Bearing Co., Canton, O., for the manufacture of seamless tubes, making a total of four units of this type for this company; a 6-ton to the Tennessee Coal, Iron & Railroad Co. at Ensley, for melting ferromanganese; a 1-ton to the Lunkenheimer Co., Cincinnati, for castings using cold scrap; a 2-ton to the Damascus Steel Casting Co., New Brighton, Pa., for manganese steel castings using cold scrap; a 3-ton to the Henry Disston Sons Co., Tacony, Pa., for saw and tool steel, using cold scrap; a 1-ton to the Warman Steel Casting Co., Los Angles, Cal., for castings using cold scrap; a 2-ton to the Connecticut Electric Steel Co., which is building a new plant in Connecticut; and two 6-ton to Armstrong, Whitworth of Canada, Ltd., Longueuil, Quebec, for forged locomotive tires, wheels and axles.

**New Malleable Plant.**—The Decatur Malleable Iron Co., Decatur, Ill., announces that its plant will be in operation Aug. 1. The officers are: A. W. Wagner, president, formerly president and general manager of the Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.; Donald E. Willard, vice president, formerly treasurer and engineer of the Allith-Prouty Co., Danville, Ill.; Irving A. Sibley Jr., secretary-treasurer, formerly secretary and general sales manager of the Allith-Prouty Co., Danville, Ill.

**Takes Option.**—E. B. Connor, of Harrisburg, has taken an option upon the plant of the Slatington Rolling Mills, Slatington, Pa. This is a small bar iron mill, consisting of six puddling furnaces, one bushelling furnace, two heating furnaces and three trains of rolls. It has been operated irregularly in recent years.

## Ship Industries Combine

The Todd Shipyards Corporation, which was organized July 1 as a holding company for the Robins Dry Dock & Repair Co., New York and Brooklyn, the Tietjen & Lang Dry Dock Co., Hoboken, N. J., and the Seattle Construction & Dry Dock Co., Seatle, has opened offices at 15 Whitehall street, New York, and organized with the following officers: President W. H. Todd; vice president, George Q. Palmer; secretary and treasurer, Carl R. Riedel. The three operating companies, although there have been some changes in their personnel, will continue to conduct their affairs as in the past. Despite rumors, there will be no consolidation of the purchasing or other departments of the three concerns. The officers of the Robins Dry Dock & Repair Co. are: President, W. H. Todd; vice president, George J. Robinson; secretary and treasurer, Carl R. Riedel. Officers of the Tietjen & Lang Dry Dock Co. are: President, George G. Raymond; vice president, Ernest Dendel; treasurer, Carl R. Riedel; secretary, Henry Frielinghaus. Officers of the Seattle Construction & Dry Dock Co. are: President, J. V. Patterson; secretary and treasurer, John Kent.

## Getting Into Service

Chicago, July 17.—The rail mill of the Minnesota Steel Co., at Duluth, has been put into service. This is the last unit of the new plant, the merchant mill having been started a few days ago. Seven open-hearth furnaces are being used, which take care of the output of the two blast furnaces. Three more open-hearth furnaces have been provided and continuous operation is assued.

## Death of H. W. Taylor

Hollinshead W. Taylor, senior member of the firm of N. & G. Taylor Co., Philadelphia, who died suddenly of heart disease July 7, at his home, Chestnut Hill, Philadelphia, was born in Philadelphia in 1850 and was the last of the third generation of Taylors connected with this company, which was established in 1810, by his grandfather, William Taylor and great uncles, George and Tracy Taylor. He began his connection with the firm under his father, and his business activity in this line covered very nearly a half century. It is an interesting fact that the art of tinning was introduced into England about the year 1720 by one of Mr. Taylor's ancestors, Major John Hanbury, of the Hanbury-Tracy family, at Pontypool, Wales, who established the first permanent plant for the production of tinplate on British soil. When the McKinley tariff made possible the production of tinplate in this country about 1891, the firm of N. & G. Taylor Co., composed of Hollinshead W. Taylor, his brother Nathan T. Taylor and his second cousin, George W. B. Taylor, immediately made the necessary arrangements to manufacture high grade tinplate in this country, the equipment and processes being transplanted bodily from Wales—thus affording a rather striking historical parallel—their forebear Major Hanbury having been the pioneer of the industry in the mother country. The business will be continued under the same name by the surviving partners, Hollinshead N. Taylor and William W. Justice.

HOLLINSHEAD W. TAYLOR

**Tenth Sale.**—The Gerline Brass Foundry Co., Kalamazoo, Mich., has bought a 1/3-ton, 75-kilowatt Rennerfelt electric furnace from Hamilton & Hansell, New York. This foundry does a general casting business. This is the tenth Rennerfelt furnace sold in the United States.

The Johnson Bronze Co., New Castle, Pa., plans to make a number of improvements to its plant. The company recently erected a new machine shop. Prack & Perrine, Pittsburgh, engineers, are in charge of the work.

The American Steel & Wire Co. expects to operate its 127-inch plate mill in the Schoenberger Works, Pittsburgh, about the middle of August. The mill has been idle since 1907.

## Would Improve Steel Plants

The future policy of the Dominion Steel Corporation, Montreal, Que., was outlined by President Mark Workman at the annual meeting of shareholders held recently. After reviewing the year's operations Mr. Workman stated that, following a personal investigation, he was of the opinion the company's coal department was equal to any on the continent, but that in order to successfully compete in the world's steel markets, after the close of the war, improvements at the steel plants were necessary. Mr. Workman advocated such improvements being made from earnings. In fact, he announced that the first step in the new policy of reducing costs and securing the utmost efficiency from the steel plants had already been taken. This consisted of the remodeling of two of the older blast furnaces on the most approved modern lines. As the furnaces had reached the stage where reconstruction was necessary in any event, the work to be carried out would not entail a serious extra expenditure. It is the president's desire to carry out the same policy throughout the entire steel plant.

## High Cost of Railroading

W. C. Nixon, receiver of the St. Louis & San Francisco railroad has issued another circular to officers and employes of the road calling attention to the present high price of materials necessary to maintenance and operation and asking that they keep down expenditures to a minimum. Mr. Nixon has prepared a list of articles showing increases of from 10 to 700 per cent in price. Since last March when he issued a similar circular, the cost of materials and supplies has advanced approximately 10 per cent. It is estimated that the purchases of the road last year amounted to $3,314,753. It is stated that if the same material had been purchased at market prices of March 13, 1916, this amount would have been increased to $5,091,460 and at the prices of June 6, to $5,426,251.

## Generous Program

The Youngstown Sheet & Tube Co. has sent word to its men who are enlisted at Camp Willis, Columbus that it will pay single men $75 a month while in the service and married men $100. Captains Freed and Woolz, of Youngstown, were in camp and made the announcement. The company also invited each Youngstown commissioned officer to buy what uniforms and equipment he needed personally up to $300.

# Bethlehem Issues Big Tool Inquiry

*List Involves Between 100 and 200 Lathes—Foreign Business Looms Large —Rumors of Price Increase Heard—Illinois Steel in Market*

THE biggest prospective business now before the machine tool trade is comprised in a large inquiry from the Bethlehem Steel Co. This involves between 100 and 200 lathes, ranging from 20 to 38 inches in swing. Negotiations on this inquiry are in a preliminary stage and it is not known when the business will be closed. It is understood that the tool builders now find themselves in a position to deliver practically all the sizes of lathes wanted within two months. Another large inquiry which has just come out, but which has not been generally circulated, involves 100 12-inch lathes, 100 14-inch, and a considerable number of 18 and 20-inch lathes. It is not known when this business, which is for export, will be closed. Outside of these developments, the machine tool market is quiet. The volume of sales both to foreign and domestic purchasers continues to grow smaller and machine tool salesmen say it is becoming less easy to close business with the general run of buyers. Some buying was done during the week by one of the eastern time-fuse makers but this did not involve an important total. In general, machine shops now are pretty thoroughly equipped to take care of the business which is now available, and consequently no marked improvement is expected for the near future. Demand from the railroads is almost totally lacking.

Despite the reduction of approximately 30 per cent in the prices of second-hand tools last week, manufacturers continue to talk about further possible advances on new tools. The planer manufacturers, especially, are almost on the point of announcing another 10 per cent increase.

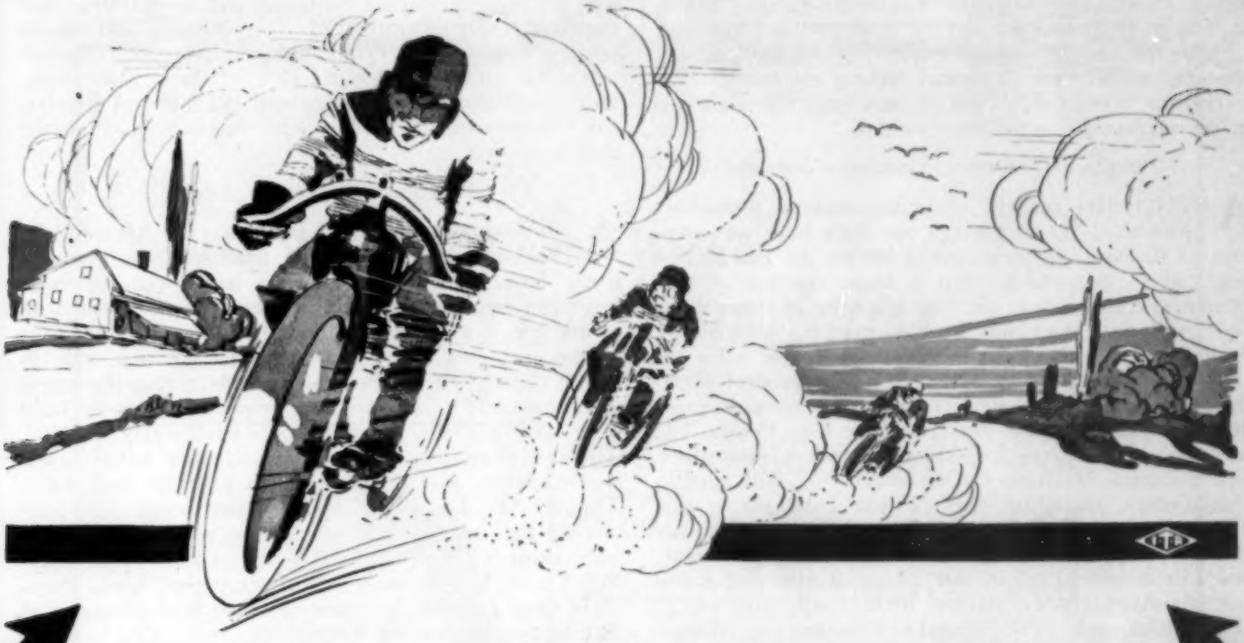
The Scott Elevator Co., a new concern, is preparing to erect a large elevator manufacturing plant at Yonkers, N. Y.; Campbell Scott, formerly manager of the Otis Elevator Co.'s Yonkers plant, is president of the concern. The Traylor Engineering Co., Allentown, Pa., which recently acquired rights to manufacture cement guns, is understood to be preparing to spend about $1,800,000 in adding to its present plant and equipment. William C. Mack, founder of the Mack Bros. Motor Car Co., has organized Metropolitan Motors, Inc., to establish a plant in New York for manufacturing a low-priced motor delivery wagon; this concern has acquired and will continue the business of the White Star Motor Truck Co., Brooklyn. F. B. Shuster Co., New Haven, Conn., is about to increase its capacity. Pyro Electrical Instrument Co. recently was organized at Trenton, N. J., to establish a plant in that city to manufacture pyrometers. Eagle Lock Co., Terryville, Conn., is erecting an addition to its screw department. Charles Delarne, New Brunswick, N. J., will put up a metal alloy manufacturing plant in that city. Barney & Berry, Springfield, Mass., are about to erect a good-sized addition. Pawtucket Screw Works, Pawtucket, R. I., will increase its capacity. Coles Tool & Machine Co., Oneida, N. Y., will build a new machine shop. Smith & Winchester Co., South Windham, Conn., will build a machine shop. Buffalo Foundry & Machine Co., Buffalo, will build a large new machine shop. C. A. Simmons Machine Co., Albany, N. Y., will build an addition. McNeil Iron Works, Brooklyn, will build a plant to replace that recently damaged by fire. United States Air Craft Co., 38 Park Row, New York, shortly will erect a 45 x 89-foot plant in Brooklyn.

### *Chicago Market Gets Big Inquiry*

AN INQUIRY by the Illinois Steel Co. for about 50 tools served to stimulate the machine tool situation in Chicago during the past week. The list, which appears in full on page 144, includes a wide variety of lathes, shapers, milling machines and miscellaneous tools for the machine shop at the Gary works, and involves an expenditure of approximately $100,000. One dealer reported an export inquiry for 100 lathes, but although a price 25 per cent less than that which obtained one year ago was quoted, the prospective purchasers refused to close, basing their refusal upon the belief that the price asked was too high. Several cases of cancelled orders have been noted among Chicago dealers, but as yet this condition has not caused any anxiety. The market continues to be buoyed by light buying on the part of domestic consumers. Since the completion of several large munition contracts, buyers have found that deliveries are more prompt. This has brought about a condition whereby a few dealers are congested with an oversupply of machines at a time when the demand is comparatively light. Some munition makers are offering large lists of second-hand tools. These are being bought up in lots by dealers. So far the prices obtained for these second-hand tools have been high.

### *Good Inquiries in Cleveland Market*

THE Cleveland machine tool market is maintaining a steady pace and while large orders are not the rule, the volume of business concluded represents a fair total. The question of deliveries has almost ceased to be a bugbear, and lathes of nearly all sizes are coming through in good time. Deliveries on planers are still delayed but open-side machines of this type are being forwarded promptly. Drill presses and boring mills are upon the deferred list as well as some lines of cylindrical grinders. Prices remain the same, though a report in the Cleveland market states that one Cincinnati concern has offered its product at a good delivery and at a price under the current quotation on that tool. The Whitney Mfg. Co., Hartford, Conn., has shaded quotations on its hand miller. Second-hand machines are maintaining the price level which has obtained during the past six months. Inquiry for screw machines for shipment to Michigan has been above normal. Several fair-sized orders were placed last week for cylindrical grinders for an Ohio automobile builder. The American Clay Machinery Co., Bucyrus, O., is in the market for a large hammer for nosing shells. The Denneen Motor Co., Cleveland, is in the market for some small equipment to be used in assembling



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Chicago Office: Room 1511-12 Lytton Building, 14 East Jackson Blvd., - - A. Schaeffer, District Representative
Philadelphia Office: 902 Widener Bldg., - - - - - - - - Frank Wallace, District Representative

motor cars. The Buckeye Engineering Co., Salem, O., is in the market for a gear-cutting machine. Charles E. Drury, manufacturers' agent, Dayton, O., is in the market for 12 thread milling machines. The Berkshire Mfg. Co., Whitney building, Cleveland, is in the market for a milling machine.

*Pittsburgh District Remains Normal*

ALTHOUGH owners of plants making projectiles and shells in Pittsburgh say they have no intention of dismantling their works before the end of the year, it is not unlikely that a large number of machines purchased for the manufacture of munitions, soon will find their way to the market. Machinery dealers do not believe, however, that the offer of second hand machinery will affect the general situation for any great length of time or to any great degree. The Keystone Steel & Wire Co., Peoria, Ill., is distributing orders for equipment for a new plant. The Alliance Machine Co., Alliance, O., will furnish nine cranes, including one 125-ton ladle crane, one 5-ton charging machine, one 5-ton bucket crane, one 100-ton stripping crane, one 5-ton soaking pit crane, one 15-ton special crane, one 10-ton gantry crane and two standard cranes, having lifting capacities of 25 and 10 tons each. The Whitaker-Glessner Co., Wheeling, W. Va., is placing contracts for its 500-ton blast furnace at Portsmouth, O. The furnace and stoves will be built by the William B. Pollock Co., Youngstown, O.; the Ingersoll-Rand Co., New York City, will install the turbo-blowers and the General Electric Co., Schenectady, N. Y., the turbines and motor generator sets.

*Cincinnati Inquiry Slackens*

A FEW months ago, in Cincinnati, the heaviest demand for lathes, milling machines and grinders came from manufacturers who had large munition contracts but this sort of business has diminished to a marked degree. This condition is no doubt due to the fact that the warring nations are now able to supply nearly all of their own needs. Manufacturers of automobile trucks in and around Cincinnati have been buying a few machine tools since early in June. The call from this source is usually for lathes, drilling machines, and portable bench grinders and drills. The F. W. Lawson Co., Cincinnati, has not purchased the equipment for its new automobile accessory plant. The Dayton Sewing Machine Co., Dayton, O., is in the market for equipment for a complete drop forging department which it is planning to put into operation in the near future.

# New Construction and Equipment

**What it is** **Where it is** **Who's doing it**

## Among New England Factories

AUGUSTA, ME.—The Armored Tire Co. has been incorporated to make automobile tires with $100,000 capital by Ernest L. McLean, Frank E. Southard and E. M. Leavitt, Winthrop, Me.

PORTLAND, ME.—The Dawson Mfg. Co. has been incorporated to make machinery with $50,000 capital by Albert F. Jones, T. L. Croteau and A. B. Farnham.

LACONIA, N. H.—The Esty Machine Co. has been incorporated to make machinery, etc., with $100,000 capital by William Esty, George W. Shurwell, Rose E. Esty, Fred F. Taylor, L. A. Dearth and Edithe H. Cate.

BOSTON.—The Higginson-Sears Corporation has been incorporated with $50,000 capital to make machinery by Ferdinand N. Phillips, Henry Masse and Marion O. Stenberg.

FALL RIVER.—The American Thread Co. will build a 76 x 196-foot bleachery, with an ell, 76 x 145-foot, a store house and additions to the power and boiler plant and an office at the Kerr mills. The improvements will cost $350,000.

GARDNER.—The Heywood Bros. & Wakefield Co. will build a mill-construction, 2-story, 500 x 600-foot, storehouse at its plant on Lake street.

MILLBURY, MASS.—A. D. Windle will build a 2-story, 140 x 120-foot addition to his plant in West Millbury.

PALMER.—A. B. and James Rathbone are building a brick, 1-story, 40 x 40-foot addition to their wire mill in Blanchardville.

WORCESTER. — The Worcester Pressed Steel Co. will build a 1-story, 34 x 36-foot addition to its plant in Greendale.

WORCESTER, MASS. — The Worcester Cold Storage & Warehouse Co. will build a brick and concrete, 4-story addition to its plant on Hygeic street.

WORCESTER.—The Worcester Brass Co. has been incorporated with $10,000 capital by James P. Doyle, Patrick Doyle and Annabel E. Doyle.

TERRYVILLE, CONN.—The Eagle Lock Co. has started work on a 5-story addition to its plant to be used as a screw department.

## From the Alleghenies to the Sea

BROOKLYN.—The Reliance Architectural Iron Works, 251-261 Monitor street, is erecting a new shop, 40 x 60 feet, as an addition to its plant. Several new structural machines are being installed.

BLOOMFIELD, N. J.—The Sprague Electric Co., manufacturer of motors and generators, will erect a 6-story, 75 x 800-foot, reinforced concrete power plant at a cost of $800,000.

JERSEY CITY, N. J.—The Jersey Forging Works has been incorporated to manufacture blacksmith supplies. The company is capitalized at $100,000 by Charles Kruse, Chicago; Benjamin E. Farrier, and Charles E. Hendrickson, Jersey City.

JERSEY CITY, N. J.—The Mayrite Machinery Mfg. Co. has been incorporated to manufacture machinery. The new company is capitalized at $50,000 by John C. Delatush, Herbert C. Gilson, Jersey City, and Maude A. Horner, Newark.

NEWARK, N. J.—The Newark Wire Cloth Co., 222 Verona avenue, has been granted a permit to erect a 1-story plant addition.

NEWARK, N. J.—Daniel Delaney & Son have been incorporated with $125,000 to manufacture machinery. The new company is incorporated by John M. Delaney, Ella L. Delaney and Emma K. Delaney, all of Newark.

NEWARK, N. J.—The General Leather Co., 422 Frelinghuysen avenue, has been granted permits to erect three large additions to its plant.

NEWARK, N. J.—Walsh's Sons & Co. have been incorporated with $100,000 capital to manufacture and deal in metals. The incorporators are Phillip C. and William H. Walsh and J. Howard Conover, Newark.

*Hot Weather Chats With*

## *ROLLING MILL JIM*

Well, fellows, this hot weather gets the Old Man. If it hadn't been that I got wise as to how to save myself a lot of work and worry, Old Jim would probably be knocked out by the heat instead of being able to locate the cool side of the Mill. You know the reason.

So long—

*Rolling Mill Jim.*

**Hubbard Steel Foundry Co.**

EAST CHICAGO, IND.

*All Kinds of Iron and Steel Rolls and Steel Castings.*

ERIE, PA.—The Erie & Western Transportation Co. has awarded the Stevens Engineering Co., Chicago, a contract for a grain elevator, to cost about $225,000.

NEW BRIGHTON, PA.—The board of education is receiving bids for a 2-story, 120 x 140-foot high school to cost about $100,000. W. G. Eckles, Lawrence Savings & Trust building, New Castle, Pa., is preparing the plans.

NORTH EAST, PA. — The North East Foundry & Machine Co., recently organized to manufacture gray iron and semi-finished steel castings, is installing new equipment in its machine shop and foundry.

PHILADELPHIA.—The Philadelphia Brass Co. has been incorporated with $6,000 capital. William E. Chickering, Philadelphia, is treasurer of the new incorporation.

PITTSBURGH.—The county commissioners are considering the construction of a 4-track bridge to replace the Bellevue bridge.

READING, PA.—John O. Beam, local manager of the Bell Telephone Co., states that $50,000 has been appropriated for additions and improvements to the Reading plant.

DOVER, DEL.—The Railway Device Co. has been incorporated with $10,000 capital to manufacture railway devices. The incorporators are Jesse E. Okmes, Arthur C. Webster and W. L. Koch, all of Oil City, Pa.

DOVER, DEL.—The Appalachian Iron, Steel & Mfg. Co. has been incorporated with $10,000,000 capital to manufacture products from iron, steel, manganese and coke, and to acquire and develope mines containing these materials. The incorporators are F. D. Buck, George W. Dillman and K. E. Longfield, Wilmington, Del.

WASHINGTON, D. C.—Sealed proposals will be received at the bureau of yards and docks, navy department, until July 29 for one electric freight elevator for the navy yard at Mare Island, Cal.

WASHINGTON.—Proposals will be received until July 31 at the office of the general purchasing officer for the Panama canal, Washington, D. C., for furnishing steel car wheels, journal bearings, steel castings, steel cable, steel doors, valves, boilers, air compressors, etc.

## Big Steel Company Inquires for 47 Machine Tools!

***The Illinois Steel Co., Chicago, Wants to Buy $100,000 Worth of Machinery for its Gary Works***

*One 48-inch x 28- foot 2-carriage, motor-driven engine lathe.*
*One 42-inch x 26-foot, 2-carriage, motor-driven engine lathe.*
*One 24-inch x 24-foot, motor-driven engine lathe.*
*One 18-inch x 8-foot, belt-driven engine lathe.*
*Two 18-inch x 10-foot, belt-driven lathes.*
*One 18-inch x 12-foot, belt-driven lathe.*
*One 24-inch x 12-foot, belt-driven lathe.*
*One 24-inch x 14-foot, belt-driven lathe.*
*One 24-inch x 16-foot, belt-driven lathe.*
*One 26-inch x 14-foot, belt-driven lathe.*
*One 36-inch x 16-foot, belt-driven lathe.*
*One 16-inch x 8-foot, belt-driven lathe.*
*One 14-inch x 6-foot, toolroom lathe.*
*One 10-inch, toolroom lathe.*
*Two 3 x 36-inch, belt-driven turret lathes.*
*One 34-inch x 10-foot bed, belt-driven Gisholt lathe.*
*One 10-foot, 4-head, motor-driven planer with a 24-foot table.*
*One 60-inch, 4-head, motor-driven planer with an 18-foot table.*
*Two 24-inch, belt-driven shapers.*
*One 24-inch, belt-driven draw-cut shaper.*
*One 36-inch, belt-driven draw-cut shaper.*
*One 14-inch slotter.*
*One No. 5, combination, knee-type, Ingersoll miller.*
*Two No. 13, Pratt & Whitney millers.*
*One 4-head, Ingersoll milling machine with 16-foot travel and 48 inches between housings.*
*One motor-driven, horizontal boring and milling machine.*
*One No. 5, Baker-type key-seater.*
*One 8-foot, motor-driven, vertical boring and turning mill.*
*One 51-inch, belt-driven boring and turning mill.*
*One 42-inch, belt-driven, boring and turning mill.*
*One No. 1, horizontal boring and drilling machine.*
*One motor-driven, Gleason, spur and bevel-gear combination.*
*Two belt-driven, twist drill grinders.*
*One No. 3, Brown & Sharp cutter and grinder.*
*One No. 12, Brown & Sharp tool grinder.*
*One 20-inch, vertical, magnetic grinder.*
*Three 3½-foot, belt-driven, radial drills.*
*One 6-foot, universal radial drill.*
*One 6-inch, bolt cutter.*
*One 96-inch x 26-foot, 600-ton, hydraulic wheel press.*

# Activities in the Central States

AKRON, O.—Franz C. Warner, architect, 767 Hippodrome building, Cleveland, will receive bids in the near future for the erection of a $90,000 warehouse and electric package terminal in Akron for the Northern Ohio Traction & Light Co., Charles Currie, Hamilton building, Akron, general manager. The building will be 1-story, 60 x 150 feet, and six stories, 55 x 180 feet.

BUCYRUS.—The Ohio Crane Co. has been incorporated with $200,000 by Charles Gallinger, H. E. Cook, E. B. Ruhl, J. J. Quaintance and A. G. Stoltz.

CINCINNATI.—Plans and specifications will be prepared at once for the new women's building at Longview hospital. The building will be of steel and will cost $250,000.

CINCINNATI.—The new $1,000,000 home of the Business Men's Club will be erected at Eighth and Race streets. It will be of steel and seven stories. Plans are now being prepared.

CINCINNATI.—Plans for the new power plant of the Union Gas & Electric Co. to be built on Fourth street have been completed. The plant will consist of three buildings, to cost with equipment, over $1,000,000. The main structure will be 225 x 275 feet. The contract for the structural steel, involving about 800 tons, has been let to the Cambria Steel Co.

CLEVELAND.—The Richard Auto Mfg. Co., 7800 Finney avenue, is building an addition to its plant. Some machine equipment will be added.

CLEVELAND.—The Samuel Austin Construction Co., 14230 Euclid avenue, is erecting a factory addition, 93 x 120 feet, brick and steel constrution, at 1089 East 152 street.

CLEVELAND.—The Damascus Co. has taken out a permit for the erection of a 2-story 70 x 158-foot, brick and steel factory, to cost $9,000.

CLEVELAND.—The Steel Products Co. has taken out a permit for the erection of a storage building at 2205 East Sixty-fifth street, which will be 82 x 123 feet, brick and steel, and will cost $8,000

CLEVELAND.—The Grasselli Chemical Co. has awarded a contract to the Crowell Lindoff- Little Co. for the erection of a $40,000 laboratory building on Broadway between East Twenty-fifth and Twenty-sixth streets. The structure will be 2-story, brick and concrete construction, 57 x 176 feet. Dunn & Demming, 808 Seventeenth street, are the architects.

CLEVELAND.—The Cleveland Iron Wire Works has taken out a permit for the erection of an iron shop to cost $25,000. A. F. Janowitz, 392 Permanent building, is the architect.

EAST YOUNGSTOWN, O.—The board of trustees of public affairs of East Youngstown will receive bids for constructing a 1,000,000-gallon filter plant, pumping station, pumps, pipe lines, etc., for its water works system. J E. McGarry is chairman of the board.

GENEVA.—G. C. Harvey announces that the Harvey System Silo Co. has leased land in Geneva near the Nickle Plate railroad upon which it will erect a reinforced concrete, 24 x 300-foot building, one story.

LORAIN, O.—The Baltimore & Ohio railroad has appropriated $500,000 for improvements to the dock at Lorain, including a coal-loading machine.

LOWELLVILLE, O.—William Wilson, engineer, Elks building, Youngstown, is receiving bids on a reinforced concrete, steel

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## Cold Drawn Seamless Steel Tubing

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Ball Bearings and Roller Bearings
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Still the Same "Old Reliable"
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standpipe, a 7-mile distribution system, pump-house, pumps, etc.

MARTINS FERRY, O.—The Bean Brothers, First and Locust streets, plan an addition to their foundry. It will be 50 x 100 feet, equipped with modern equipment, fireproof throughout, with two wings, 30 x 100 feet and will cost $25,000.

PORTSMOUTH, O.—The Whitaker-Glessner Co. has awarded the following contracts for the erection of its new blast furnace. Foundations, including 25,000 cubic yards of cement to Sheridan & Kirk, Portsmouth, the plate and casting work to the William B. Pollock Co., Youngstown, and the turbo-blowers to the Ingersoll-Rand Co., Pittsburgh.

STEUBENVILLE.—Armor & Co., Chicago, will erect a storage plant in Steubenville at a cost of about $100,000. The proposed building will be three stories and of reinforced concrete construction and will contain an ice machine.

WARREN, O.—The Warren City Tank & Boiler Co. plans to build a 1-story warehouse. A. R. Hughes, North Park avenue, is president of the company.

WARREN, O.—The Trumbull Public Service Corporation will install a new filtration plant for the water supply of the city. Plans are being prepared by Chester & Fleming, Pittsburgh.

YOUNGSTOWN, O.—Ernest Salow plans to build a 10-story hotel to cost $250,000.

YOUNGSTOWN, O.—The American Sintering Co. has awarded the Stone & Webster Engineering Co. a contract for a plant to cost about $100,000.

YOUNGSTOWN, O.—The Mahoning Motor Co. has been incorporated with $20,000 capital by R. H. Rogers, Myron DeVinne, A. O. Flemming, P. H. Stambaugh and Louis S. Baldwin.

FAIRMONT, W. VA.—The Fairmont Hotel Co. plans to build a 5-story hotel, 47 x 150 feet. Milburn, Heister & Co., Washington, D. C., are preparing the plans.

HUNTINGTON, W. VA.—The Fulton Tool Co., recently organized by A. L. Bastianelli and others, has purchased a site at Twenty-fifth and Guyan streets, upon which it will build a factory to be occupied by the Fulton Tool Works, Canal Fulton, O.

MORGANTOWN, W. VA.—The West Virginia university will receive bids on two 2-story buildings, to cost about $200,000. Paul A. Davis, 1713 Sansom street, Philadelphia, is preparing the plans.

WHEELING, W. VA.—The Wheeling Can Co. is remodeling the factory in South Warwood, formerly occupied by the Packard Motor Truck Co., and is installing new machinery for the manufacture of tin cans.

FRANKLIN.—The National Mfg. Co. has been incorporated with $100,000 capital and has purchased a factory site in Franklin upon which it will manufacture a new type of air cooler

INDIANAPOLIS, IND. — The Diamond Chain & Mfg. Co. will build a 4-story factory building on a 6-acre site on Kentucky avenue. The building will be of reinforced concrete construction, 60 x 380 feet, with two wings, 100 feet long.

KOKOMO, IND.—A site for a plant to be built by the Haynes Stellite Co. has been purchased and plans have been completed for a building 60 x 120 feet.

SOUTH BEND.—The report recently published that the Studebaker Co., South Bend, will build tire factories in several cities has proved to be erroneous and without foundation.

SOUTH BEND, IND. — The Studebaker Municipal Utilities Co. has been incorporated with a capitalization of $100,000 to manufacture municipal machinery. The directors are Frederick S. Fish, A. R. Erskine and A. B. Thielens.

DETROIT.—The Puritan Machine Co. has started the erection of a large, 2-story, brick addition to its plant.

FLINT.—The Dort Motor Car Co. has taken out a permit for the erection of a warehouse on Smith street to cost $70,000.

KALAMAZOO, MICH. — The Acme Universal Joint Co. will build a factory, office and machine shop building, 1-story, 76 x 200 feet, costing $20,000. B. O. Rhodes is the superintendent.

KALAMAZOO, MICH.—The Thermophore Mfg. Co. has been incorporated to manufacture gas heaters. The company is capitalized at $60,000 by Harry den Blyker, E. P. Lewis and Edwin Desenberg.

MONROE, MICH.—The commissioners have awarded a contract to the Hanneman Bros., Detroit, for the erection of two bridges over the Raisin river at a cost of $55,700.

MUSKEGON HEIGHTS, MICH.—The Enterprise Brass Works is taking bids on a factory addition, three stories, 50 x 150 feet, to cost $35,000.

ANTIGO, WIS.—Articles of incorporation have been filed by the Rotary Gas Engine & Pulverizer Co., to manufacture farm machinery. The capital stock is $25,000 and the incorporators are W. A. Maertz, Charles Rishel and Charles Friedel.

BERLIN, WIS.—Parkinson & Dockendorff, architects, LaCrosse, Wis., are preparing plans for a $100,000 high school for the city of Berlin. The building will be 136 x 136 feet, 2-stories and basement, with a central heat and power plant, including manual training facilities, 56 x 70 feet.

FOND DU LAC, WIS.—The MacIntyre-McDonald Co. has been incorporated with a capital of $5,000 to manufacture sheet metal specialties, ventilating systems, etc. The incorporators are Edward MacIntyre, Nelson A. McDonald and L. MacIntyre.

KENOSHA, WIS.—White & White, architects, have been commissioned to prepare plans for a factory addition for the Peter Pirsch Co., manufacturer of fire apparatus. The new building will be 100 x 200 feet and accommodate the blacksmithing and painting department, the warehouse and stock room. An investment of $25,000 is planned.

KEWAUNEE, WIS.—The Aluminum Sign Co., W. Leyse, secretary, will enlarge its plant and install some new equipment.

MILWAUKEE. — Carl Barkhausen, architect, Iron block, is preparing plans for a foundry costing $5,000 to be erected at Sixty-third avenue and Burnham street, West Allis.

MILWAUKEE.—Fred Maettig, architect, is taking bids for the erection of a 2-story factory and garage to be erected on the west side. The factory will be 40 x 100 feet, the garage 30 x 60 feet, and the project will involve between $20,000 and $25,000.

MILWAUKEE. — The Heil Co., Twenty-sixth and Montana avenues, manufacturer of structural steel, tanks, etc., will build a large shop building. Plans are being prepared by Klug & Smith, consulting engineers, Mack block, for a 1-story brick, concrete and steel structure, 80 x 200 feet.

MILWAUKEE.—The Ruess & Beyer Electrical Co., Milwaukee, has taken the contract for installing a 240-kilovolt-ampere generator unit with an exciter, switchboard, etc., in the power plant of the Nunn & Bush Shoe Co., Fifth and Hadley streets. It will cost about $4,500.

MILWAUKEE.—The public sewerage commission awarded the contract for the Kinnickinnic river intercepting sewer to the Wisconsin Tunnel & Construction Co., Milwaukee, at $267,386. This work requires about 1,000 feet of 48-inch cast iron pipe, as previously noted.

MILWAUKEE.—The Pan-American Rubber Co. has been organized to establish a large factory for the manufacture of pneumatic tires. The new concern is capitalized at $200,000 by F. J. Ramler, Norman J. Kopmeier and H. C. Clauson. Quarters have been leased in the Kopmeier industrial building at Third and Poplar streets.

MILWAUKEE.—The Wisconsin Telephone Co. has awarded a general contract for the construction of its new 8-story brick, concrete and steel exchange building on Broadway to the George A. Fuller Co., 140 South Dearborn street, Chicago. The structural steel contract has been awarded to the Wisconsin Bridge & Iron Co., Milwaukee.

MILWAUKEE.—Klug & Smith, consulting engineers, Mack block, are ready for bids on the new drop forging plant for the John Obenberger Forge Co. at Sixty-third avenue and Lapham street, West Allis. As previously noted, it will be 80 x 150 feet, 1-story, brick and steel, with a 50 x 60-foot power house, and 70-foot steel stack. The company will purchase a 5-ton electric traveling crane, furnaces, forges, boilers and much other machinery and equipment. John Obenberger is the general manager.

RICHLAND CENTER, WIS.—The Allis-Chalmers Mfg. Co., Milwaukee, will furnish the municipal electric light plant with a 312-kilovolt-ampere unit, consisting of a simple, high-pressure, non-condensing, heavy-duty, corliss engine, a generator, exciter and a switchboard at a cost of $10,426.

SHEBOYGAN, WIS.—The Advance Machine y Co., formerly of Toledo, O., will erect a plant at Sheboygan and move its business to that city. The plant will consist of two buildings, 80 x 275 feet and of concrete and steel construction.

SHEBOYGAN, WIS.—The Citizens Telephone Co. has purchased a site, 120 x 150 feet, at Center avenue and North Seventh street and is making plans for the erection of a building costing about $35,000.

WAUSAU, WIS. — The Resilient Auto Wheels Co., recently incorporated, will establish a factory at Wausau.

WAUWATOSA, WIS.—A. D. and P. G. Warren, owners of the Suburban Garage, 26-30 State street, will make additions costing $10,000 and purchase considerable new equipment, including an electric freight elevator.

JOPLIN, MO.—The Joplin road district commission will build a $3,000 or $4,000 bridge over the Turkey creek.

KANSAS CITY, MO.—The construction of a new pumping station is being considered. W. W. Harnden, care of the fire and water board, is interested.

KANSAS CITY, MO.—Plans have been completed by Waddell & Son for a steel viaduct at Thirty-first and Brighton avenues to cost $60,000.

MARSHALL, MO.—The city of Marshall plans the construction of an electric light plant to cost $75,000. Henrici, Kent & Lowry, 715 Reserve bank building, Kansas City, are the engineers.

ST. JOSEPH, MO.—The Aniser Mfg. Co. has been incorporated with $8,000 capital by J. A. Aniser, John D. Richardson and J. E. Dolman. The new company will manufacture machinery and tools.

ST. LOUIS.—The Merchants' Truck Co. has been incorporated to operate a machine and repair shop. The company is capitalized at $15,000 by H. F. Steele, John A. Young and

ST. LOUIS.—Kilpatrick & Sons will build an addition to their foundry.

# In the South and Around the Gulf

BIG STONE GAP, VA. — The Intermont Coal & Iron Corporation has been incorporated with $500,000 capital by R. T. Irvine, Big Stone Gap; L. M. Williams, Richmond, and J. W. Kelley.

QUANTICO, VA.—The International Steel & Ship Building Co., in which Thos. Shay, Quantico, and Hugh McIsaac, Champlain apartments, Washington, D. C., are interested, has let a contract to the Kaucher & Hodges Co., Memphis, Tenn., for the erection of a ship yard to cost about $500,000.

CHARLOTTE, N. C.—The Johnson Mfg. Co. will erect a new 3-story, 78 x 200-foot mill with a capacity of 12,000 spindles. C. W. Johnson is president of the company.

BIRMINGHAM, ALA.—The Great Southern Graphite Co. has been incorporated with $2,000 capital and will erect a 100-ton mill to operate on a 78-acre site controlled by the company. The incorporators are H. O. Moore, J. P. H. deWindt and F. L. Holberg.

PONTOTOC, MISS.—The McCreary Waterworks Co., Atlanta, Ga., is planning to construct a waterworks system at Pontotoc.

CHATTANOOGA.—The S. S. Sulzberger & Sons Co. will erect a cotton oil mill in Alton park at a cost of $200,000.

HAMILTON COUNTY, TENN.—The Velvet Edge Iron Co. has been incorporated with $5,000 capital by H. M. Reed, Charles Hurdle, John C. Vance, J. A. Chambliss and S. R. Roddy.

KNOXVILLE, TENN.—D. C. Hodgson, Halston National Bank building, will purchase a 33-inch saddle-tank locomotive gage.

KNOXVILLE, TENN.—The John G. Duncan Co., 308 West Jackson avenue, is in the market for second-hand Schindler end-matcher for end matching flooring, asking for dealer's price and immediate shipment.

NASHVILLE, TENN.—The Nashville Bridge Co. is in the market for several 3-inch, centrifugal pumps, driven by gasoline engines, direct-connected or short drive.

SHELBY COUNTY, TENN.—The Southern Iron & Metal Co. has been incorporated with $3,000 capital by Louis Nord, B. Singer, Lee Rome, Nathan Lindy and Berth Songer.

TRENTON, TENN.—A steam-driven cotton mill to be equipped with a hydraulic press with automatic tampers, and four 70-saw ginheads, is to be erected at Trenton by the Louvera Cotton Mills Co. as an adjunct to its mills.

BOWLING GREEN, KY.—Extensive machinery and power improvements are being made in the local Axe-Handle Factory. The Nashville Machine Co., Nashville, Tenn., having the contract which includes a 200-horsepower corliss engine.

EARLINGTON, KY.—A municipal lighting plant to cost $20,000 is projected by the city of Earlington. Information may be obtained from the mayor.

FRANKLIN, KY. — The Simpson county fiscal court will advertise soon for bids for a 220-foot steel bridge to span the Red river near the Wade farm. This is a state-aid contract estimated to cost about $10,000.

LOUISVILLE, KY.—D. X. Murphy & Bro., architects, Louisville Trust building, will prepare plans and supervise the construction of the new $300,000 auditorium.

LOUISVILLE, KY.—Improvements to include three new buildings and equipment at a cost of $200,000 are to be undertaken by the National Foundry & Machine Co., Fifteenth and Main streets. Adam Vogt is head of the company.

NEWPORT, KY.—A garbage incinerator plant will be built by city of Newport, at a cost of $40,000. Special equipment will be needed.

OWENSBORO, KY.—G. W. Stout & Sons, cooperage manufacturers, are making extensive improvements to their hand work plant and propose to equip it with modern machinery. W. R. Stout is in charge of these plans.

BEAUMONT, TEX.—The Texas Plating & Wire Works has been incorporated with $2,500 capital by John Dollinger, C. A. Wrong and F. M. Hall.

DALLAS, TEX.—The Deep Tillage Tractor Co. has been incorporated with $10,000 capital by Bennett W. Reed, R. B. George and S. B. Canter.

HOUSTON, TEX.—The Houston Blow Pipe & Sheet Metal Works, 2010 Congress avenue, is to enlarge its plant and install additional machinery.

KINGSVILLE, TEX.—A municipal waterworks system is being considered. Henry C. Porter is the city engineer.

WICHITA FALLS, TEX.—Bonds for $80,000 have been voted for three steel bridges over the Wichita river. The county clerk will furnish details.

BLANCHARD, OKLA.—A municipal waterworks and electric light plant are being considered.

BRISTOW, OKLA.—H. W. Hartsaw and associates have organized a company to build a factory for the manufacture of a patent lightning arrester.

TULSA, OKLA. — The Oklahoma Pipe Welding Co. has been incorporated with $2,000 capital stock; by O. B. Farnsworth Jr., Tulsa, and others.

# Pacific Coast and Western Canada

OAKLAND, CAL.—The American Coin Register Co., 1706 Broadway, is building a 2-story factory at Emeryville, Cal.

RIO VISTA, CAL.—Plans are being prepared by F. A. Seiger, county engineer, for a bridge over the Sacramento river.

SAN BERNARDINO, CAL.—The Fontana Development Co., Fontana, plans to build a hydro-electric power plant, costing $350,000. A. B. Miller is the president.

SEATTLE.—The Pacific Foundry & Machinery Co. has been incorporated with $500,000 capital by J. L. McDonald, H. S. Hendrickson and Frank A. Paul.

SEATTLE.—C. E. Mack and C. E. Fox, of the Seattle-Astoria Iron Works, have purchased the Astoria Machine Co. at Astoria, Ore., and will enlarge it at a cost of $25,000.

SEATTLE.—The Washington Iron Works is to add another steel casting furnace to its plant. Other equipment to be added will bring the amount of expenditures up to $100,000.

SEATTLE.—The Fisher Flour Mills Co. has plans prepared for ten galvanized iron elevators of 30,000 bushels capacity. They will cost from $6,000 to $7,000. C. R. Fisher, Great Falls, Mont., will handle the work.

SEATTLE.—J. V. Patterson, president of the Seattle Construction & Dry Dock Co., announces the immediate expenditure of approximately $1,000,000 for additions and improvements to the plant. Plans include the construction of a large new floating dry dock, the enlargement of the present dry dock and other improvements. The concern was recently merged with the Robbins Dry Dock & Repair Co., Brooklyn, N. Y., and the Tietjen & Lang Dry Dock Co., Hoboken, N. J.

SPOKANE, WASH.—The Porter Brothers, Spokane, have been awarded a contract for building a steam heating and electric power plant for the Spokane Heat, Light & Power Co. at a cost of $88,000.

ASTORIA, ORE.—The port of Astoria has voted to install an electric coal handling device to cost $28,000 on pier No. 2.

SALEM, ORE.—The McEachern-Standifer-Clarkson Ship Co. has organized with a capital of $500,000. The principals are Standifer & Clarkson, Portland, Ore., and McEachern, Astoria, Ore., and Seattle. The place of business is not named, but probably will be at Astoria.

EDMONDS, B. C.—The Olympic Metals Co. has taken a lease on the Edmond Electric Power building and will remodel it for the installation of a modern metals refining and smelting plant.

FALSE CREEK, B. C.—H. H. McLeod, general manager of the Canadian Northern railroad, Vancouver, B. C., is calling for tenders for the erection of a new passenger station at False Creek, B. C., to cost approximately $1,000,000.

NEW WESTMINSTER, B. C.—The Westminster Marine Railway Co. has made application for the lease of Poplar island in the Fraser river, British Columbia. The company has started clearing the site for the erection of a ship building plant on the island to cost $70,000 and will install $15,000 worth of machinery in the plant. Ways will be constructed capable of handling the largest boats in the coast trade.

PRINCE RUPERT, B. C.—The Imperial Oil Co. will make extensive improvements and install additional oil handling facilities to its plant at Prince Rupert. C. D. Stillman is vice president of the company.

STUMP LAKE, B. C.—A Seattle syndicate has taken over the property of the Nicola Mining & Smelting Co. at Stump Lake near Kamloops, B. C., and will install a 100-ton concentrator plant and other machinery.

VANCOUVER, B. C.—The Granby Consolidated Mining & Smelting Co. will install a steam power plant at the Anyox Smelter to be used as an auxiliary during the winter.

VANCOUVER, B. C.—The Hendry Crossman Electric Co., 80 East Dufferin street, is in the market for a 12 or 15-kilowatt, 110-volt, direct current generator.

VANCOUVER, B. C.—The Northern Construction Co., Vancouver, and the Carter, Halls, Aldinger Co., Winnipeg, have a joint contract to construct the $1,000,000 depot to be erected at Vancouver by the Canadian Northern Railway Co.

# IRON AND STEEL PRICES

**Corrected up to Tuesday noon**

## PIG IRON

(Lower price to Jan. 1, 1917; higher to July 1, 1917.)

| | |
|---|---|
| Bessemer valley | $21.00 to 21.50 |
| Bessemer, Pittsburgh | 21.95 to 22.45 |
| Basic, Pittsburgh | 18.95 to 19.20 |
| Basic, eastern Pa. | 19.00 to 19.50 |
| Basic, Buffalo | 19.00 to 19.50 |
| Malleable, Pittsburgh | 19.45 to 19.95 |
| Malleable foundry, Chicago | 19.50 |
| Malleable foundry, Philadelphia | 21.00 to 21.50 |
| Malleable foundry, Buffalo | 18.50 to 19.00 |
| No. 1X foundry, Philadelphia | 20.25 to 20.75 |
| No. 2 foundry, Pittsburgh | 19.45 to 19.70 |
| No. 2 foundry, Cleveland | 18.80 to 19.30 |
| No. 2 foundry, Ironton | 18.50 to 19.00 |
| No. 2 foundry, Chicago | 19.00 |
| No. 2X foundry, Philadelphia | 19.75 to 20.25 |
| No. 2X foundry, N. J. tidewater | 19.75 to 20.25 |
| No. 2X foundry, Buffalo | 18.50 to 19.00 |
| No. 2 plain, Philadelphia | 19.25 to 19.75 |
| No. 2 plain, N. J. tidewater | 19.25 to 19.75 |
| No. 2 plain, Buffalo | 18.25 to 18.75 |
| No. 2 southern, Birmingham | 14.00 to 15.00 |
| No. 2 southern, Cincinnati | 16.90 to 17.90 |
| No. 2 southern, Chicago | 18.00 to 19.00 |
| No. 2 southern, Phila. delivery | 19.00 to 19.50 |
| No. 2 southern, Cleveland | 18.00 to 19.00 |
| No. 2 southern, New York docks | 18.00 to 18.50 |
| No. 2 southern, Boston docks | 18.25 to 18.75 |
| No. 2 south. interior, New Eng. | 19.00 to 20.00 |
| No. 2 southern, St. Louis | 18.40 to 18.90 |
| Virginia No. 2X, furnace | 18.50 to 19.00 |
| Virginia 2X, Philadelphia | 21.25 to 21.75 |
| Virginia, No. 2X, Jersey City | 21.00 to 21.50 |
| Virginia 2X, Boston points | 21.75 to 22.25 |
| Gray forge, eastern Pa. | 18.50 to 19.00 |
| Gray forge, Pittsburgh | 18.95 |
| Gray forge, Birmingham | 13.00 to 14.00 |
| Silveries, 8 per cent, furnace | 24.00 to 27.00 |
| Silveries, 8 per cent, Chicago | 31.50 |
| Low phos. Standard, Phila. | 32.00 to 34.00 |
| Low phos. Lebanon, Pa. furnace | 29.00 to 31.00 |
| Low phos. Pittsburgh | 30.00 to 31.00 |
| Charcoal, Lake Superior, Chgo., Nos. 1 to 4 | 19.75 to 22.25 |
| Charcoal, Buffalo | 21.00 to 22.00 |
| Charcoal, Birmingham | 22.50 to 23.00 |

## IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

| | |
|---|---|
| Old range Bessemer, 55 per cent, ton | 4.45 |
| Mesabi Bessemer, 55 per cent, ton | 4.20 |
| Old range non-Bess., 51½ per cent, ton. | 3.70 |
| Mesabi non-Bess., 51½ per cent, ton | 3.55 |

Eastern Ores.
(Per unit delivered eastern Pennsylvania.)

| | |
|---|---|
| Pt. Henry fur., 60 per cent, unit | 8.5c to 8.9c |
| Local N. Y. and N. J. ores, unit | 8.5c to 8.75c |
| Port Henry lump, at mines, ton. | $4.00 |

Foreign Ores.
(Per unit Philadelphia.)
(Prices nominal.)

| | |
|---|---|
| Foreign Bess., 50 to 65 per cent. | 8 to 8½ |
| For'n non-Bess., 50 to 65 per cent. | 8 to 8½ |

## COKE

(At the ovens.)

| | |
|---|---|
| Connellsville furnace | $2.65 to 2.75 |
| Connellsville fur., contract | 2.40 to 2.50 |
| Connellsville foundry, contract | 3.15 to 3.40 |
| Connellsville foundry | 3.00 to 3.25 |
| Wise county furnace, contract | 2.85 to 3.25 |
| Wise county foundry, contract | 3.50 to 3.75 |
| Pocahontas foundry, contract | 3.25 to 3.75 |
| Pocahontas furnace, contract | 2.85 to 3.25 |
| New River foundry, contract | 3.75 to 4.25 |
| New River furnace, contract | 3.25 to 3.50 |

## FERRO ALLOYS AND STEEL MAKING METALS

| | |
|---|---|
| Ferro manganese, 80 per cent, seaboard, prompt | $175 to 200 |
| Ferro manganese, 80 per cent, seaboard, contract | 175 |
| Spiegel, 20 per cent, fur. early and last half | 50.00 to 55.00 |
| Ferro-silicon, 50 per cent, Phil. | 83.00 to 85.00 |
| Ferro-silicon, 50 per cent, Pbgh. | 83.00 to 85.00 |

Bessemer ferro-silicon, 9 per cent to 10 per cent, $32.00; 10 to 11 per cent, $33.00; 11 to 12 per cent, $34.00; 12 to 13 per cent, $35.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

## SEMI-FINISHED MATERIAL

| | |
|---|---|
| Open hearth billet, Phila. | $45.00 to 50.00 |
| Forging billets, Phila. | 65.00 to 70.00 |
| Forging billets, Pbgh., nominal. | 65.00 to 70.00 |
| Forging billets, Chicago | 65.00 |
| Wire rods, Pittsburgh (nom.) | 60.00 to 65.00 |
| Bessemer billets, Youngstown | 40.00 to 45.00 |
| Bessemer billets, Pittsburgh | 40.00 to 45.00 |
| Open hearth billets, Pittsburgh | 40.00 to 45.00 |
| Open hearth billets, Youngstown | 40.00 to 45.00 |
| Bess. sheet bars, Youngstown | 40.00 to 45.00 |
| Op. h'th sheet bars, Youngstown | 40.00 to 45.00 |
| Bess. sheet bars, Pittsburgh | 40.00 to 45.00 |
| Open hearth sheet bars, Pbgh. | 40.00 to 45.00 |
| Muck bars, Pittsburgh (nominal) | 40.00 to 45.00 |

### SKELP

| | |
|---|---|
| Grooved steel skelp | 2.50c |
| Sheared steel skelp | 2.75c |

## RAILS AND TRACK MATERIAL

(Gross tons.)

| | |
|---|---|
| Stand. Bess. rails, Pbgh. & Chg. delivery after May 1, 1917 | $33.00 |
| Stan. op.-h'th rails, Pbg. & Chg. delivery after May 1, 1917 | 35.00 |
| Light rails, 8 to 10 lbs., Pbgh. | 50.00 |
| Light rails, 8 lb., Chicago | 43.00 |
| Light rails, 12 to 14 lbs., Pbgh. | 49.00 |
| Light rails, 12 lbs., Chicago | 42.00 |
| Light rails, 16 to 20 lbs., Pbgh. | 48.00 |

### Freight Rates, Pig Iron

| | |
|---|---|
| Mahoning and Shenango valleys to:— | |
| Cleveland | $0.95 |
| Newark, N. J. | 2.98 |
| Boston | 3.18 |
| Philadelphia | 2.78 |
| Pittsburgh | .95 |
| St. Louis | 3.18 |
| Buffalo to:— | |
| Albany, N. Y. | $1.26 |
| New England (all rail) | 2.58 |
| New York and Brooklyn (all rail) | 2.58 |
| New York and Brooklyn (by canal) | 1.25 to 1.60 |
| Virginia furnaces to:— | |
| Boston docks (r. and w.) | $3.05 |
| New England (all rail) | 3.25 |
| New York dock (r. and w.) | 2.88 |
| Birmingham, Ala., to:— | |
| Cincinnati | $2.90 |
| Chicago | 4.00 |
| Cleveland | 4.00 |
| Louisville, Ky. | 2.65 |
| New York (all rail) | 6.15 |
| New York, (r. and w.) | 4.25 |
| Philadelphia (all rail) | 5.20 |
| Philadelphia (r. and w.) | 4.00 |
| Pittsburgh | 4.90 |
| Savannah, Ga. | 2.75 |
| Chicago to:— | |
| Des Moines | $2.80 |
| Milwaukee | .50 |
| Moline, Ill. | 1.40 |
| Omaha | 3.58 |
| St. Louis | 1.58 |
| Ironton and Jackson, O., to:— | |
| Chicago | $2.54 |
| Cincinnati | 1.26 |
| Cleveland | 1.62 |
| Detroit | 1.81 |
| Indianapolis | 1.58 |

| | |
|---|---|
| Light rails, 16 to 20 lbs., Chgo. | $41.00 |
| Light rails, 25 to 45 lbs., Pbgh | 47.00 |
| Light rails, 25 to 45 lbs., Chgo. | 40.00 |
| Relaying rails, standard, Pbgh. and Chicago | $23.00 to 24.00 |
| Relaying rails, light, Chicago | 24.00 to 25.00 |
| Angle bars, st. sect., Pbgh. base | 2.00c |
| Angle bars, st. sections, Chgo. | 2.00c to 2.50c |
| Spikes, railroad, Pittsburgh | 2.65c to 2.75c |
| Spikes, railroad, Chicago | 2.75c to 2.90c |
| Track bolts, Pittsburgh | 3.25c to 3.50c |
| Track bolts, Chicago | 3.25c to 3.50c |
| Tie plates, Chicago | 50.00 to 55.00 |

## SHAPES, PLATES AND BARS

| | |
|---|---|
| Structural shapes, Pbgh. | 2.50c to 2.75c |
| Structural shapes, Philadelphia | 2.659c to 2.909c |
| Structural shapes, Chgo. | 2.69c to 3.29c |
| Structural shapes, New York | 2.669c to 2.919c |
| Tank plates, Chgo. | 3.09c to 3.49c |
| Tank plates, Pittsburgh (con.) | 2.90c to 3.00c |
| Tank plates, Pittsburgh | 3.00c to 4.00c |
| Tank plates, Philadelphia | 3.059c to 4.159c |
| Tank plates, New York | 3.069c to 4.169c |
| Bars, soft steel, Chicago | 2.69c to 3.29c |
| Bars, soft steel, Pbgh. | 2.50c to 2.75c |
| Bars, soft steel, New York | 2.669c to 2.916c |
| Bars, soft steel, Philadelphia | 2.659c to 2.905c |
| Hoops, carloads, Pittsburgh | 2.75c to 3.00c |
| Bands, Pittsburgh | 2.50c to 2.75c |
| Shafting, Pbgh., contr. carloads | 15 to 20 off |
| Bar iron, Chgo. | 2.35c to 2.50c |
| Bar iron, Philadelphia | 2.559c |
| Bar iron, Cleveland | 2.40c |
| Bar iron, New York | 2.569c |
| Bar iron, Pittsburgh | 2.65c to 2.75c |
| Hard steel bars, Chgo. | 2.50c to 2.75c |

## SHEETS AND TIN PLATE

*Bessemer.*

### BLUE ANNEALED SHEETS PITTSBURGH

| | Per lb. |
|---|---|
| Nos. 3 to 8 | 2.85c to 3.05c |
| Nos. 9 to 10 | 2.90c to 3.00c |
| Nos. 11 and 12 | 3.00c to 3.20c |
| Nos. 13 and 14 | 3.05c to 3.25c |
| Nos. 15 and 16 | 3.15c to 3.35c |

*Bessemer.*

### BOX ANNEALED SHEETS, COLD ROLLED PITTSBURGH

| | |
|---|---|
| Nos. 17 to 21 | 2.70c to 2.85c |
| Nos. 22 and 24 | 2.75c to 2.90c |
| Nos. 25 and 26 | 2.80c to 2.95c |
| No. 27 | 2.85c to 3.00c |
| No. 28 | 2.90c to 3.05c |
| No. 29 | 2.95c to 3.10c |
| No. 30 | 3.05c to 3.30c |

*Bessemer.*

### GALVANIZED SHEETS OF BLACK SHEET GAGE, PITTSBURGH

| | |
|---|---|
| Nos. 10 and 11 | 3.25c to 3.50c |
| No. 12 | 3.35c to 3.60c |
| Nos. 13 and 14 | 3.35c to 3.60c |
| Nos. 15 and 16 | 3.50c to 3.75c |
| Nos. 17 to 21 | 3.65c to 3.90c |
| Nos. 22 and 24 | 3.80c to 4.05c |
| Nos. 25 and 26 | 3.95c to 4.20c |
| No. 27 | 4.10c to 4.35c |
| No. 28 | 4.25c to 4.50c |
| No. 29 | 4.45c to 4.70c |

| | |
|---|---|
| No. 28, black, Chicago | 3.09c to 3.19c |
| No. 28, galvanized, Chicago | 4.49c |
| No. 10, blue annealed, Phila. | 3.409c to 3.909c |
| No. 10, blue annealed, Chgo. | 3.19c to 3.29c |
| Tin plate, 100 lb., coke base | $5.75 to 6.00 |

## IRON AND STEEL PIPE

(Prices Adopted April 21, 1916.)

Steel.

| Butt weld:— | Black. | Galv. |
|---|---|---|
| ⅛, ¼ and ⅜ in. | 63 | 30 |
| ½ in. | 67 | 40 |
| ¾ to 3 in. | 70 | 50 |
| **Lap weld:—** | | |
| 2 in. | 65 | 40 |
| 2½ to 6 in. | 68 | 48 |
| 7 to 12 in. | 65 | 44½ |
| 13 and 14 in. | 53½ | .. |
| 15 in. | 51 | .. |

Iron.

| Butt weld:— | Black. | Galv. |
|---|---|---|
| ⅛ and ¼ in. | 52 | 19 |
| ⅜ in. | 53 | 20 |
| ½ in. | 57 | 33 |
| ¾ to 1½ in. | 60 | 38 |
| **Lap weld:—** | | |
| 1¼ in. | 48 | 26 |
| 1½ in. | 54 | 33 |
| 2 in. | 55 | 34 |
| 2½ to 4 in. | 57 | 37 |
| 4½ to 6 in. | 57 | 37 |
| 7 to 12 in. | 56 | 36 |

## BOILER TUBES

| | |
|---|---|
| Steel, 3½ to 4½ inches, l. c. l. | 50 to 52 |
| Iron, 3½ to 4½ inches, l. c. l. | 40 to 42 |

## WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotations.)

| | |
|---|---|
| Wire nails, jobbers', Pittsburgh | $2.50 to 2.70 |
| Plain wire, jobbers', Pittsburgh | 2.45 to 2.65 |
| Galvanized wire, jobbers', Pbgh. | 3.15 to 3.35 |
| Polished staples, Pbgh. | 2.65 to 2.85 |
| Galvanized staples, Pbgh. | 3.35 to 3.55 |
| Barb wire, painted, jobbers' Pbgh. | 2.65 to 2.85 |
| Barb wire, galv., jobbers', Pbgh. | 3.35 to 3.55 |

# IRON AND STEEL PRICES

**Corrected up to Tuesday noon**

## BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled thread, 50 and 10, cut threads, 50, larger or longer, 40.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or short, rolled 50, 10 and 5; cut, 50 and 5; larger or longer, 40 and 10.

Cold pressed, semi-finished hexagon nuts, 60 and 10.

Gimlet and cone point lag bolts, 50 and 10. Hot pressed square, blank or tapped nuts, $2.90 off list; hot pressed hexagon blank or tapped, $2.90.

Cold pressed square, blank or tapped, $2.60 off; hexagon, blank or tapped, all sizes, $3.00.

## RIVETS

| | |
|---|---|
| Structural rivets, Pbgh | 4.00c to 4.25c |
| Structural rivets, Chgo. delivery | 3.50c |
| Boiler rivets, Pbgh | 4.10c to 4.35c |
| Boiler rivets, Chgo. delivery | 3.60c |

## STEEL SHEET PILING

(Pittsburgh)

| | |
|---|---|
| Base sizes | 2.50c |

## STANDARD STEEL CHAIN

| | |
|---|---|
| Chain, ⅜ inch proof coil | 5.00c to 5.50c |

## COLD ROLLED STRIP STEEL

Base price 6.00c to 6.50c per 100 pounds, hard, coils 1½ inches and wider and by .100 inches and heavier.

Extra for Thickness.

| | |
|---|---|
| 0.100-inch and thicker | Base |
| 0.050 to 0.099 | $0.05 |
| 0.036 to 0.049 | 0.20 |
| 0.035 | 0.20 |
| 0.031 to 0.034 | 0.35 |
| 0.026 to 0.030 | 0.45 |
| 0.020 to 0.024 | 0.55 |
| 0.025 | 0.45 |
| 0.017 to 0.019 | 1.35 |
| 0.015 to 0.016 | 1.75 |
| 0.013 to 0.014 | 2.45 |
| 0.012 | 2.80 |
| 0.011 | 3.15 |
| 0.010 | 3.50 |

Other extras as per card of March 15, 1916.

## CAST IRON WATER PIPE

| | |
|---|---|
| Four-inch, Chicago | $33.50 to 34.00 |
| Six-inch and larger, Chicago | 30.50 to 31.00 |
| Six-inch Class B, New York | 30.50 |
| Four-inch Class B New York | 33.50 |
| Four to six-inch Birmingham | 28.00 |
| Six-inch and larger Birmingham | 25.00 |

Light weight water and gas pipe $1 per ton higher than standard water.

## WAREHOUSE PRICES

| | |
|---|---|
| Steel bars, Chicago | 3.10c |
| Steel squares, 2-in. & ov., Cleve. | 3.75c |
| Steel rounds, 2-in. & ov., Cleve. | 3.75c |
| Steel bars, under 2 in., Cleveland | 3.25c |
| Steel bars, Detroit | 3.25c |
| Steel bars, Philadelphia | 3.25c to 4.10c |
| Steel bars, New York | 3.00c to 3.25c |
| Steel bars, St. Louis | 3.15c |
| Steel bars, Cincinnati | 3.20c to 3.75c |
| Steel bars, St. Paul | 3.20c |
| Steel bars, over 2-in., Buffalo | 4.20c |
| Steel bars, Buffalo | 3.35c |
| Iron bars, Chicago | 3.10c |
| Iron bars, Cleveland | 3.20c |
| Iron bars, Detroit | 3.25c |
| Iron bars, St. Louis | 3.10c |
| Iron bars, Cincinnati | 3.20c to 3.75c |
| Iron bars, Philadelphia | 3.00c to 3.25c |
| Iron bars, New York | 3.25c |
| Shapes, Chgo. | 3.10c |
| Shapes, Detroit | 3.25c |
| Shapes, St. Louis | 3.15c |
| Shapes, St. Paul | 3.20c |
| Shapes, New York | 3.00c to 3.25c |
| Shapes, Cleveland | 3.25c |
| Shapes, Philadelphia | 3.00c to 3.25c |
| Shapes, Buffalo | 3.35c |
| Shapes and plates, Cincinnati | 3.20c to 3.50c |
| Plates, Chgo. | 3.50c |
| Plates, Detroit | 3.60c to 4.00c |
| Plates, St. Louis | 3.55c |
| Plates, St. Paul | 3.60c |
| Plates, New York | 4.25c to 4.50c |
| Plates, Cleveland | 3.65c |
| Plates, Philadelphia | 4.00c to 4.25c |
| No. 10 blue anl. sheets, Chgo. | 3.40c |
| No. 10 blue anl. sheets, Cleve. | 3.50c |
| No. 10 blue anl. sheets, Buffalo | 3.25c |
| No. 10 blue anl. sheets, St. L. | 3.45c |
| No. 10 blue anl. sheets, Cinci. | 3.40c to 3.50c |
| No. 10 blue anl. sheets, St. Paul | 3.50c |
| No. 10 blue anl. sheets, Detroit | 3.55c |
| No. 28 black sheets, Chgo. | 3.20c |
| No. 28 black sheets, Cleveland | 3.20c to 3.25c |
| No. 28 black sheets, Cinci. | 3.25c to 3.40c |
| No. 28 black sheets, Detroit | 3.50c |
| No. 28 black sheets, St. Louis | 3.30c |
| No. 28 black sheets, St. Paul | 3.35c |
| No. 28 galv. sheets, Chgo. | 5.25c to 5.50c |
| No. 28 galv. sheets, Cleveland | 5.25c |
| No. 28 galv. sheets, Cincinnati | 5.25c |
| No. 28 galv. sheets, Detroit | 5.25c |
| No. 28 galv. sheets, St. Louis | 5.30c to 5.50c |

## Freight Rates, Coke

| | |
|---|---|
| Connellsville district, per 2,000 lbs., to:— | |
| Baltimore | $1.80 |
| Buffalo | 1.85 |
| Chicago | 2.50 |
| Cleveland | 1.60 |
| Detroit | 2.10 |
| East St. Louis | 2.80 |
| Joliet | 2.50 |
| Louisville | 2.50 |
| Milwaukee | 2.85 |
| New York | 2.85 |
| Philadelphia | 2.05 |
| Pittsburgh | .75 |
| Richmond, Va. | 2.94 |
| Toledo | 1.85 |
| Valley Furnaces | 1.20 |
| Cincinnati | 2.00 |

## IRON AND STEEL SCRAP

(Net Tons.)

| | |
|---|---|
| Angle bars, iron, Chicago | $18.50 to 19.00 |
| Angle bars, steel, St. Louis | 13.00 to 13.50 |
| Arch bars and transoms, Chgo. | 19.50 to 20.00 |
| Arch bars and transoms, St. L. | 19.50 to 20.00 |
| Boiler plate, cut, No. 1, Chgo. | 10.50 to 11.00 |
| Boiler plate, cut, No. 1, St. L. | 7.50 to 8.00 |
| Boiler punchings, Chicago | 13.50 to 14.00 |
| Bundled sheet, Cincinnati | 8.25 to 8.75 |
| Busheling, No. 1, Chicago | 12.00 to 12.50 |
| Busheling, No. 1, Cincinnati | 10.00 to 10.50 |
| Busheling, No. 1, Cleveland | 11.75 to 12.00 |
| Busheling, No. 1, St. Louis | 11.50 to 12.00 |
| Busheling, No. 2, Chicago | 9.00 to 9.50 |
| Cast borings, Chicago | 6.00 to 6.50 |
| Cast borings, Cincinnati | 6.00 to 6.50 |
| Cast borings, Cleveland | 6.00 |
| Cast borings, St. Louis | 5.75 to 6.25 |
| Cast, No. 1, Chicago | 12.00 to 12.50 |
| Cast, No. 1, Cincinnati | 10.50 to 11.00 |
| Cast, No. 1, Cleveland | 13.00 to 13.50 |
| Cast, No. 1, St. Louis | 10.25 to 10.75 |

## Freight Rates, Finished Material

| From Pittsburgh, carloads, per 100 lbs. to:— | |
|---|---|
| New York | 16.9 cents |
| Philadelphia | 15.9 cents |
| Boston | 18.9 cents |
| Buffalo | 11.6 cents |
| Baltimore | 15.4 cents |
| Cleveland | 10.5 cents |
| Cincinnati | 15.8 cents |
| Chicago | 18.9 cents |
| Minneapolis and St. Paul | 32.9 cents |
| Denver | 68.6 cents |
| St. Louis | 23.6 cents |
| New Orleans | 30 cents |
| Birmingham | 45 cents |
| Pacific coast (all rail) | 73.9 cents |
| Pacific coast (tin plate) | 70 cents |
| Pacific coast, via Panama canal | 61.9 cents |

| | |
|---|---|
| Cut forge, Chicago | 13.75 to 14.25 |
| Iron axles, St. Louis | 23.00 to 24.00 |
| Iron axles, Cleve. | 23.00 to 24.00 |
| Knuckles, coup., Chicago | 15.50 to 16.00 |
| Knuckles, coup., St. Louis | 13.50 to 14.00 |
| Locomtive tires, Chicago | 20.00 to 20.50 |
| Locomotive tires, St. Louis | 20.00 to 20.50 |
| Machine shop turnings, Chgo. | 5.50 to 6.00 |
| Machine shop turnings, Cleve. | 6.00 to 6.25 |
| Machine shop turnings, Cincinnati | 6.00 to 6.50 |
| Machine shop turnings, St. L. | 6.25 to 6.75 |
| Malleable agricultural, Chgo. | 11.00 to 11.50 |
| Malleable agricultural, St. Louis | 10.00 to 10.50 |
| Malleable, Cincinnati | 8.25 to 8.75 |
| Malleable railroad, Chicago | 11.75 to 12.25 |
| Malleable railroad, St. Louis | 10.50 to 11.00 |
| Pipes and flues, Cleveland | 11.25 to 11.50 |
| Pipes and flues, Chgo. | 10.75 to 11.25 |
| Pipes and flues, St. Louis | 10.00 to 10.50 |
| Railroad wrought, No. 1, Chgo. | 15.50 to 16.00 |
| Railroad wrought, No. 1, Cleve. | 14.00 |
| Railroad wrought, No. 1, St. L. | 15.00 to 15.50 |
| Railroad wrought, No. 1, Cinci. | 13.00 to 13.50 |
| Railroad wrought, No. 2, Chgo. | 14.25 to 14.75 |
| Railroad wrought, No. 2 St. L. | 14.25 to 14.75 |
| Shafting, St. Louis | $17.00 to 17.50 |
| Spring, St. Louis | 13.50 to 14.00 |
| Springs, Chicago | 16.00 to 16.50 |
| Steel car axles, St. Louis | 26.00 to 26.50 |
| Steel car axles, Chicago | 26.00 to 26.50 |
| Stove plate, Chicago | 9.25 to 9.75 |
| Stove plate, Cleveland | 10.00 |
| Stove plate, Buffalo | 11.00 to 11.50 |
| Stove plate, Cincinnati | 8.25 to 8.75 |
| Stove plates, St. Louis | 7.50 to 8.00 |

(Gross tons.)

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| Axle turnings, Cleveland | $11.50 to 12.00 |
| Busheling, No. 1, Buffalo | 13.00 to 13.50 |
| Busheling, No. 1, Pittsburgh | 13.00 to 13.50 |
| Busheling, No. 2, Buffalo | 11.00 to 11.50 |
| Bundled sheets, Pittsburgh | 12.50 to 13.00 |
| Bundled sheets, Cleveland | 12.50 to 12.75 |
| Bundled sheets, Buffalo | 11.50 to 12.00 |
| Car wheels (iron), Pittsburgh | 14.00 to 14.50 |
| Car wheels (steel), Pittsburgh | 17.50 to 18.00 |
| Car wheels, Chicago | 12.50 to 13.00 |
| Car wheels, eastern Pa. | 16.00 to 16.50 |
| Car wheels, Buffalo | 13.00 to 13.50 |
| Car wheels, N. Y. | 13.75 to 14.00 |
| Car wheels, St. Louis | 12.00 to 12.50 |
| Car wheels, Birmingham | 10.50 to 11.00 |
| Tram car wheels, B'ham | 9.50 to 10.00 |
| Cast borings, New York | 7.50 to 8.00 |
| Cast borings, eastern Pa. | 10.00 to 10.50 |
| Cast borings, Buffalo | 8.00 to 8.25 |
| Cast borings, Pittsburgh | 8.75 to 9.00 |
| Cast, No. 1, eastern Pa. | 16.00 to 16.50 |
| Cast, No. 1, Pittsburgh | 14.75 to 15.00 |
| Cast, No. 1, Birmingham | 10.50 to 11.00 |
| Cast, heavy No. 1, N. J. points | 16.50 to 17.00 |
| Forge, No. 1, eastern Pa. | 13.00 to 13.50 |
| Frogs, switches, guards, St. L. | 14.50 to 15.00 |
| Grate bars, Buffalo | 11.50 to 12.00 |
| Grate bars, N. J. points | 12.50 to 13.00 |
| Heavy axle turnings, Buffalo | 12.00 |
| Heavy melting steel, Pbgh | 16.50 to 17.25 |
| Heavy melting steel, Buffalo | 15.50 to 16.00 |
| Heavy melting steel, Chgo. | 14.25 to 14.75 |
| Heavy melting steel, Cleveland | 14.50 to 15.50 |
| Heavy melting steel, Cincinnati | 14.00 to 14.50 |
| Heavy melting steel, eastern Pa. | 15.25 to 15.75 |
| Heavy melting steel, New York | 14.00 to 14.25 |
| Heavy melting steel, St. L. | 14.50 to 15.00 |
| Heavy melting steel, B'ham | 10.00 to 10.50 |
| Iron rails, Chgo. | 18.50 to 19.00 |
| Iron rails, Buffalo | 18.00 to 18.50 |
| Iron rails, Cincinnati | 13.50 to 14.00 |
| Iron rails, St. Louis | 16.50 to 17.00 |
| Iron rails, Cleveland | 18.00 |
| Iron axles, Pittsburgh | 25.50 to 26.00 |
| Iron axles, Cincinnati | 20.00 to 20.50 |
| Iron axles, eastern Pa. | 27.00 to 28.00 |
| Iron axles, Chicago | 26.75 to 27.25 |
| Iron axles, Buffalo | 24.00 to 24.50 |
| Low phos. steel, Buffalo | 20.00 to 20.50 |
| Low phos. steel, Pbgh | 19.50 to 20.50 |
| Low phos. steel, eastern Pa. | 20.00 to 21.00 |
| Machine shop turnings, Buffalo | 7.00 to 7.50 |
| Mch. shop turnings, New York | 7.00 to 7.50 |
| Mch. shop turnings, Pbgh | 8.50 to 8.75 |
| Mch. shop turnings, eastern Pa. | 8.50 to 9.00 |
| Malleable railroad, Cleveland | 14.25 to 14.75 |
| Malleable railroad, Buffalo | 15.00 to 16.00 |
| Malleable railroad, Pittsburgh | 14.00 |
| Malleable railroad, eastern Pa. | 13.00 to 13.50 |
| R. R. and mch. cast, No. 1 Bfl. | 15.50 to 16.00 |
| R. R. wrought, No. 1, Buffalo | 17.25 to 17.75 |
| R. R. wrgt., No. 1, eastern Pa. | 19.50 to 20.00 |
| R. R. wrgt., No. 1, New York | 18.00 to 18.50 |
| R. R. wrought, No. 1, Pbgh. | 18.25 to 18.75 |
| R. R. wrought, No. 1, B'h'm. | 10.00 to 10.50 |
| Reroll. rails, 5 ft. & ov., Pbgh. | 14.75 to 17.25 |
| Reroll. rails, 5 ft. & ov., Chgo. | 15.50 to 16.00 |
| Reroll. rails, 5 ft. & ov., E. P. | 17.25 to 17.50 |
| Reroll. rails, 5 ft. & ov., St. L. | 15.75 to 16.25 |
| Shafting, New York | 20.00 to 20.50 |
| Shafting, eastern Pa. | 20.00 to 21.00 |
| Shoveling steel, Chicago | 13.50 to 14.00 |
| Shoveling steel, St. Louis | 12.00 to 12.50 |
| Steel rails, short, Chicago | 15.50 to 16.00 |
| Steel rails, short, Cleveland | 18.00 |
| Steel rails, over 6 ft. | 14.25 to 14.50 |
| Steel rails, old, B'h'm | 10.50 to 11.00 |
| Steel rails, short, St. Louis | 14.50 to 15.00 |
| Steel car axles, Birmingham | 21.00 to 22.00 |
| Steel car axles, New York | 25.00 to 25.50 |
| Steel car axles, Buffalo | 24.00 to 24.50 |
| Steel car axles, Cleveland | 28.00 |
| Steel car axles, Pittsburgh | 26.50 to 27.00 |
| Steel car axles, eastern Pa. | 25.00 to 26.00 |
| Stove plate, N. J. points | 12.25 to 12.50 |
| Stove plate, Birmingham | 9.50 to 10.00 |
| Stove plate, Pittsburgh | 11.00 to 11.25 |
| Stove plate, eastern Pa. | 12.00 to 12.50 |
| Wrought pipe, New York | 10.25 to 10.75 |
| Wrought pipe, eastern Pa. | 12.50 to 13.00 |
| Wrought pipe, Buffalo | 12.00 to 12.50 |

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### ACETYLENE IN CYLINDERS.
Linde Air Products Co., New York City.
Prest-O-Lite Co., The, Indianapolis, Ind.

### ACCUMULATORS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Tod, Wm., Youngstown, O.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Watson-Stillman Co., New York City.
Wood, R. D., & Co., Philadelphia, Pa.

### ACCUMULATORS. (Hydraulic.)
Southwark Fdy & Mch. Co., Philadelphia, Pa.

### AEROPLANE WIRE, STRAND AND CORD.
Roebling's, John A., Sons Co., Trenton, N. J.

### ALLOYS.
American Vanadium Co., Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng
Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Steel Co., Canton, O.

### ALUMINUM ALLOYS.
United Smelt'g & Alum. Co., New Haven, Ct.

### ALUMINUM. (Granulated.)
United Smelt'g & Alum. Co., New Haven, Ct.

### ALUMINUM. (Solder.)
United Smelt'g & Alum. Co., New Haven, Ct.

### ALUMINUM. (Vanadium.)
American Vanadium Co., Pittsburgh, Pa.

### ALUMINUM INGOTS.
United Smelt'g & Alum. Co., New Haven, Ct.

### ALUMINUM RODS. (Sheet.)
United Smelt'g & Alum. Co., New Haven, Ct.

### ANGLES, TEES, CHANNELS.
(See Steel, Structural.)

### ANNEALING BOXES AND POTS.
Mesta Machine Co., Pittsburgh, Pa.
Pittsburgh Annealing Box Co., Pittsburgh, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa.
Swedish Crucible Steel Co., Detroit, Mich.
United Engrg. & Foundry Co., Pittsburgh, Pa.
Zanesville Malleable Iron Co., Zanesville, O.

### ARMATURES.
Crocker-Wheeler Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

### ASH BUCKETS.
Lakewood Engrg. Co., Cleveland, O.

### AXLES.
American Bridge Co., New York City.
Bethlehem Steel Co., So. Bethlehem, Pa.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.

### BABBITT METAL.
Keystone Bronze Co., Pittsburgh, Pa.
Lubricating Metal Co., The, New York City.

### BAKERS, WIRE COATING.
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O

### BALLS. (Steel.)
Bethlehem Steel Co., The, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.

### BANDS. (Steel.)
Carnegie Steel Co., Pittsburgh, Pa.

### BARGES. (Steel.)
American Bridge Co., New York City.

### BARRELS, TUMBLING. (Wire Nails.)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

### BARS—ALLOY.
Central Steel Co., The, Massillon, O.

### BARS. (Concrete Reinforcing.)
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trussed Concrete Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

### BARS. (Iron and Steel.)
American Bridge Co., New York, N. Y.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Trussed Concrete Steel Co., Detroit, Mich.
United Steel Co., Canton, O.
Upson Nut Co., Cleveland, O.

### BEAMS, CHANNELS AND ANGLES.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.

### BEARINGS. (Ball.)
New Departure Mfg. Co., Bristol, Conn.

### BEARINGS. (Vanadium Steel.)
American Vanadium Co., The, Pittsburgh, Pa.

### BELLS. (Marine and Locomotive.)
Vanduzen, E. W., Co., The, Cincinnati, O.

### BELT CEMENT AND DRESSING.
Dixon, Jos., Crucible Co., Jersey City, N. J.
Graton & Knight Mfg. Co., Worcester, Mass.
Texas Company, The, New York City.
Williams, I. B., & Sons, Dover, N. H.

### BELT LACING. (Leather.)
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.
Williams, I. B., & Sons, Dover, N. H.

### BELTING. (Chain.)
Link-Belt Company, Chicago, Ill.

### BELTING—LEATHER.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.
Williams, I. B., & Sons, Dover, N. H.

### BENCHES. (Steel.)
New Britain Mach. Co., New Britain, Conn.

### BENCHES AND FRAMES. (Drawing.)
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

### BENDING AND STRAIGHTENING MACHINES.
Abramsen Engrg. Co., Pittsburgh, Pa.
Bertsch & Co., Cambridge City, Ind.
Birdsboro St'l Fdy. & Mch. Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Covington Machine Co., Covington, Va.
Espen-Lucas Machine Works, Philadelphia, Pa.
Hinman, D. A., & Co., Sandwich, Ill.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., New York, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Watson-Stillman Co., New York, N. Y.

### BENZOL RECOVERY PLANTS.
Koppers, H., Co., Pittsburgh, Pa.

### BILLETS.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
Whitaker-Glessner Co., Portsmouth Works, Portsmouth, O.
Wood, Alan, Iron & Steel Co., Philadelphia.
Youngstown Sheet & Tube Co., Youngstown.

### BLAST FURNACE SKIP CARS.
Lakewood Engrg. Co., Cleveland, O.

### BLAST FURNACE TUYERES.
Keystone Bronze Co., Pittsburgh, Pa.

### BLAST FURNACE VOLUME METERS.
Clark, Chas. J., Chicago, Ill.

### BLOCKS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.

### BLOOMS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Hillman, J. H., & Sons, Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
Wood, Alan, Iron & Steel Co., Philadelphia.
Youngstown Sh't & Tube Co., Youngstown, O.

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